

FOREWORD

This workshop manual covers Disassembly, Inspection and Assembly procedures for the following Manual Transmission:

Manual Transmission: M550

For On-vehicle Servicing (Inspection, Adjustment, Troubleshooting, Removal and installation) of the Manual transmission, refer to the workshop manual for the applicable model.

All information in this manual is based on the latest product information at the time of publication. However, specifications and procedures are subject to change without notice.

If you find any failures in this manual, you are kindly requested to inform us by using the report form on the next page.

Workshop Manual Quality Report

Att.) Service Manager,
Your Distributor

| | | | |
|---------------------|--|------------------|--|
| Pub. No. | | Issue Date | |
| Name of Dealer | | Name of Reporter | |
| Subject | | | |
| Problem Description | | | |
| Correction Proposal | | | |

CAUTION

This manual does not include all the necessary items about repair and service. This manual is made for the use of persons who have special techniques and certifications. If non-specialized or uncertified technicians perform repairs or service only using this manual or without proper equipment or tools, this may cause severe injury to you or other persons nearby and also cause damage to your customer's vehicle.

In order to prevent dangerous operation and damage to your customer's vehicle, be sure to follow the instructions shown below.

- This manual must be read thoroughly. It is especially important to have a good understanding of all the contents written in the PRECAUTION of "INTRODUCTION" section.
- The service method written in this manual is very effective to perform repair and service. When performing the operations following the procedures using this manual, be sure to use tools specified and recommended. If using non-specified or tools other than recommended tools and service methods, be sure to confirm the safety of the technicians and that there is no possibility of causing personal injury or damage to the customer's vehicle before starting the operation.
- If part replacement is necessary, the part must be replaced with the same part number or equivalent part. Do not replace it with an inferior quality part.
- It is important to note that this manual contains various "Cautions" and "Notices" that must be carefully observed in order to reduce the risk of personal injury during service or repair, or reduce the possibility that improper service or repair may damage the vehicle or render it unsafe. It is also important to understand that these "Cautions" and "Notices" are not exaggerations and are possible hazardous consequences that might result from failure to follow these instructions.

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INTRODUCTION

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HOW TO USE THIS MANUAL TRANSMISSION WORKSHOP MANUAL

01077-04

GENERAL INFORMATION

1. GENERAL DESCRIPTION

- (a) This manual is made in accordance with SAE J2008.
- (b) Generally repair operations can be separated in the following 3 main processes:
 1. Diagnosis
 2. Removing and Installing, Replacing, Disassembling, Installing and Checking, Adjusting
 3. Final Inspection
- (c) This manual explains "Removing and Installing, Replacing, Disassembling, Installing and Checking, Adjusting", but "Final Inspection" is omitted.
- (d) The following essential operations are not written in this manual, however these operations must be done in the practical situation.
 - (1) Operation with a jack or lift
 - (2) Cleaning of a removed part when necessary
 - (3) Visual check

2. INDEX

- (a) An alphabetical INDEX is provided as a section on the end of the book to guide you to the item to be repaired.

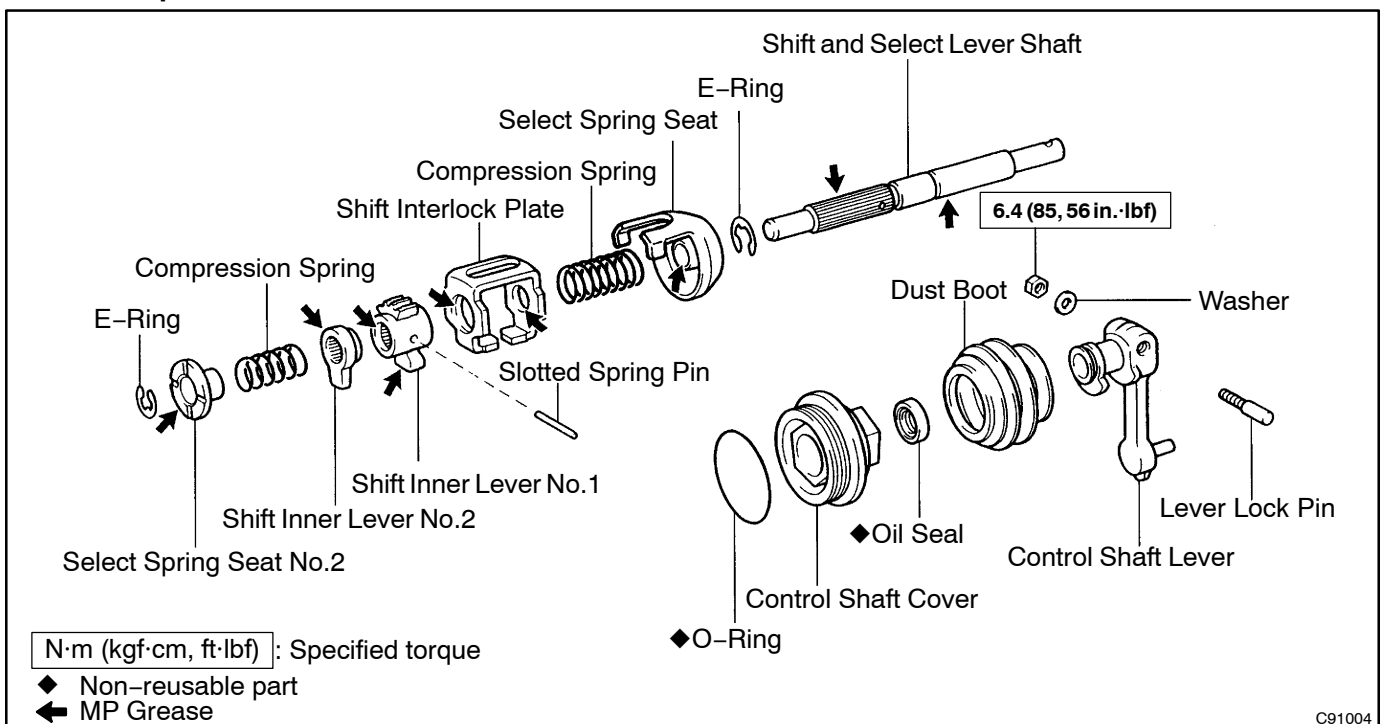
3. PREPARATION

- (a) Use of special service tools (SST) and special service materials (SSM) may be required, depending on the repairing condition. Be sure to use SST and SSM when they are required and follow the working procedure properly. A list of SST and SSM is in the Preparation section of this manual.

4. REPAIR PROCEDURES

- (a) Component drawing is placed as the section or title when necessary.
- (b) Illustrations of the parts catalog are placed as the "disassembled parts drawing" so that it enables you to understand the fitting condition of the components.
- (c) Non-reusable parts, grease applied parts, precoated parts and tightening torque are specified in the components drawing.

Example:



- (d) Tightening torque, oil applying position, and non-reusable parts are described as important points in the procedure.

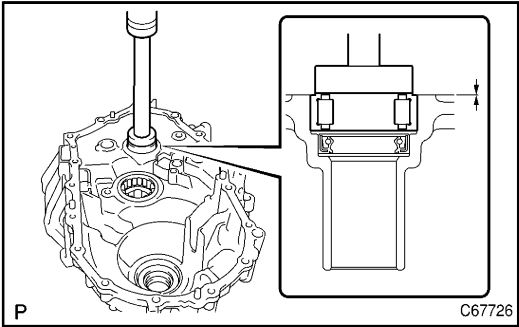
NOTICE:

There are cases where such information can only be indicated by an illustration. In that case, all the information such as torque, oil, etc. are described in the illustration.

- (e) Installing procedure of operation items is performed in the reverse order of the removing, and only the important points are described.
- (f) Only items with points are described in the procedure, and the operational portion and content are placed using an illustration. In the explanations, details of the operational method, standard value and notice are placed.
- (g) There may be a case where the illustrations of similar models are used. In that case the details may be different from the actual vehicle.
- (h) The procedures are presented in a step-by-step format:
- (1) The illustration shows what to do and where to do it.
 - (2) The task heading tells what to do.
 - (3) The detailed text tells how to perform the task and gives other information such as specifications and warnings.

Example:

*Illustration:
what to do and where*



Task heading: what to do

37. INSTALL INPUT SHAFT FRONT BEARING

(a) Coat the new input shaft front bearing with MP grease, using SST and a press, install it to the front transaxle case.
Drive in depth: 0 to 0.3 mm (0 to 0.118 in.)
 SST 09950-60010 (09951-00420)

Set part No.

Component part No.

*Detailed text:
how to do task*

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HINT:

This format provides an experienced technician with a FAST TRACK to the necessary information. The task heading can be read at a glance when necessary, and the text below provides detailed information. Important specifications and warnings always stand out in bold type.

5. SERVICE SPECIFICATIONS

- (a) Specifications are presented in bold type throughout the manual. You never have to leave the procedure to look up your specifications. The specifications are also found in the Service Specifications section for a quick reference.

6. TERMS DEFINITION

| | |
|---------|--|
| CAUTION | Indicate the possibility of injury to you or other people. |
| NOTICE | Indicate the possibility of damage to the components being repaired. |
| HINT | Provide additional information to help you perform the repair efficiently. |

7. SI UNIT

- (a) The UNITS given in this manual are primarily expressed according to the SI UNIT (International System of Unit), and alternately expressed in the metric system and in the English System.

Example:

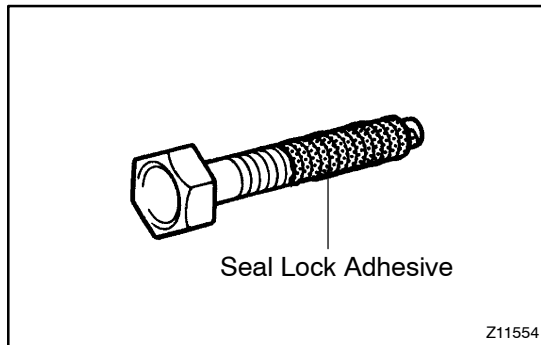
Torque: 30 N·m (310 kgf·cm, 22 ft·lbf)

REPAIR INSTRUCTION FOR MANUAL TRANSMISSION WORKSHOP MANUAL

01078-04

PRECAUTION

1. BASIC REPAIR HINT



(a) PRECOATED PARTS

- (1) Precoated parts are bolts, nuts, etc. that are coated with a seal lock adhesive at the factory.
- (2) If a precoated part is retightened, loosened or caused to move in any way, it must be recoated with the specified adhesive.
- (3) When reusing precoated parts, clean off the old adhesive and dry with compressed air. Then apply the specified seal lock adhesive to the bolt, nut or threads.

NOTICE:

Do the torque checking with the lower limit value of the torque tolerance.

- (4) Depending on the seal lock agent to apply, there may be a case where it is necessary to leave it for a specified time until it hardens.
- (b) GASKETS
When necessary, use a sealer on gaskets to prevent leaks.
- (c) BOLTS, NUTS AND SCREWS
Carefully observe all specifications for bolt tightening torques. Always use a torque wrench.

TERMS FOR MANUAL TRANSMISSION WORKSHOP MANUAL

ABBREVIATIONS USED IN THIS MANUAL

01079-04

| Abbreviations | Meaning |
|---------------|---------------------------|
| E/G | Engine |
| FIPG | Formed In Place Gasket |
| MAX | Maximum |
| MIN | Minimum |
| MP | Multipurpose |
| M/T | Manual Transmission |
| N | Neutral |
| No. | Number |
| RH | Right-Hand |
| SPEC | Specification |
| SSM | Special Service Materials |
| SST | Special Service Tools |
| STD | Standard |
| T/A | Transaxle |
| T/M | Transmission |
| w/ | With |
| w/o | Without |
| 1st | First |
| 2nd | Second |

GLOSSARY OF SAE AND HINO TERMS

This glossary lists all SAE–J1930 terms and abbreviations used in this manual in compliance with SAE recommendations, as well as their Hino equivalents.

| SAE ABBREVIATIONS | SAE TERMS | HINO TERMS ()--ABBREVIATIONS |
|----------------------|---|---|
| A/C | Air Conditioning | Air Conditioner |
| ACL | Air Cleaner | Air Cleaner |
| AIR | Secondary Air Injection | Air Injection (AI) |
| AP | Accelerator Pedal | – |
| B+ | Battery Positive Voltage | +B, Battery Voltage |
| BARO | Barometric Pressure | – |
| CAC | Charge Air Cooler | Inter cooler |
| CARB | Carburetor | Carburetor |
| CFI | Continuous Fuel Injection | – |
| CKP | Crankshaft Position | Crank Angle |
| CL | Closed Loop | Closed Loop |
| CMP | Camshaft position | Cam Angle |
| CPP | Clutch Pedal Position | – |
| CTOX | Continuous Trap Oxidizer | – |
| CTP | Closed Throttle Position | – |
| DFI | Direct Fuel Injection (Diesel) | Direct Injection (DI) |
| DI | Distributor Ignition | – |
| DLC1 DLC2 DLC3 | Data Link Connector 1 Data Link Connector 2 Data Link Connector 3 | 1: Check Connector 2: Total Diagnosis Communication Link (TDCL) 3: OBD II Diagnostic Connector |
| DTC | Diagnostic Trouble Code | Diagnostic Code |
| DTM | Diagnostic Test Mode | – |
| ECL | Engine Control Level | – |
| ECM | Engine Control Module | Engine ECU (Electronic Control Unit) |
| ECT | Engine Control Temperature | Coolant Temperature, Water Temperature (THW) |
| EEPROM | Electrically Erasable Programmable Read Only Memory | Electrically Erasable Programmable Read Only Memory (EEPROM), Erasable Programmable Read Only Memory (EPROM) |
| EFE | Early Fuel Evaporation | Cold Mixture Heater (CMH), Heat Control Valve (HCV) |
| EGR | Exhaust Gas Recirculation | Exhaust Gas Recirculation (EGR) |
| EI | Electronic Ignition | Distributorless Ignition (DI) |
| EM | Engine Modification | Engine Modification (EM) |
| EPROM | Erasable Programmable Read Only Memory | Programmable Read Only Memory (PROM) |
| EVAP | Evaporative Emission | Evaporative Emission Control (EVAP) |
| FC | Fan Control | – |
| FEEPROM | Flash Electrically Erasable Programmable Read Only Memory | – |
| FEPROM | Flash Erasable Programmable Read Only Memory | – |
| FF | Flexible Fuel | – |
| FP | Fuel Pump | Fuel Pump |
| GEN | Generator | Alternator |
| GND | Ground | Ground (GND) |
| HO2S | Heated Oxygen Sensor | Heated Oxygen Sensor (HO2S) |
| IAC | Idol Air Control | Idol Speed Control (ISC) |
| IAT | Intake Air Temperature | Intake or Inlet Air Temperature |
| ICM | Ignition Control Module | – |
| IFI | Indirect Fuel Injection | Indirect Injection |
| IFS | Inertia Fuel–Shutoff | – |

| | | |
|------------------|---|---|
| ISC | Idle Speed Control | – |
| KS | Knock Sensor | Knock Sensor |
| MAF | Mass Air Flow | Air Flow Meter |
| MAP | Manifold Absolute Pressure | Manifold Pressure Intake Vacuum |
| MC | Mixture Control | Electric Bleed Air Control Valve (EBCV) Mixture Control Valve (MCV) Electric Air Control Valve (EACV) |
| MDP | Manifold Differential Pressure | – |
| MFI | Multiport Fuel Injection | Electronic Fuel Injection (EFI) |
| MIL | Malfunction Indicator Lamp | Check Engine Light |
| MST | Manifold Surface Temperature | – |
| MVZ | Manifold Vacuum Zone | – |
| NVRAM | Non-Volatile Random Access Memory | – |
| O ₂ S | Oxygen Sensor | Oxygen Sensor, O ₂ Sensor (O ₂ S) |
| OBD | On-Board Diagnostic | On-Board Diagnostic (OBD) |
| OC | Oxidation Catalytic Converter | Oxidation Catalyst Converter (OC), CC ₀ |
| OP | Open Loop | Open Loop |
| PAIR | Pulsed Secondary Air Injection | Air Suction (AS) |
| PCM | Powertrain Control Module | – |
| PNP | Park/Neutral Position | – |
| PROM | Programmable Read Only Memory | – |
| PSP | Power Steering Pressure | – |
| PTOX | Periodic Trap Oxidizer | Diesel Particulate Filter (DPF) Diesel Particulate Trap (DPT) |
| RAM | Random Access Memory | Random Access Memory (RAM) |
| RM | Relay Module | – |
| ROM | Read Only Memory | Read Only Memory (ROM) |
| RPM | Engine Speed | Engine Speed |
| SC | Supercharger | Supercharger |
| SCB | Supercharger Bypass | – |
| SFI | Sequential Multiport Fuel Injection | Electronic Fuel Injection (EFI), Sequential Injection |
| SPL | Smoke Puff Limiter | – |
| SRI | Service Reminder Indicator | – |
| SRT | System Readiness Test | – |
| ST | Scan Tool | – |
| TB | Throttle Body | Throttle Body |
| TBI | Throttle Body Fuel Injection | Single Point Injection Central Fuel Injection (Ci) |
| TC | Turbocharger | Turbocharger |
| TCC | Torque Converter Clutch | Torque Converter |
| TCM | Transmission Control Module | Transmission ECU (Electronic Control Unit) |
| TP | Throttle Position | Throttle Position |
| TR | Transmission Range | – |
| TVV | Thermal Vacuum Valve | Bimetallic Vacuum Switching Valve (BVSV) Thermostatic Vacuum Switching Valve (TVSV) |
| TWC | Three-Way Catalytic Converter | Three-Way Catalytic (TWC) CC _{RO} |
| TWC+OC | Three-Way + Oxidation Catalytic Converter | CC _R + CC _O |
| VAF | Volume Air Flow | Air Flow Meter |
| VR | Voltage Regulator | Voltage Regulator |
| VSS | Vehicle Speed Sensor | Vehicle Speed Sensor |
| WOT | Wide Open Throttle | Full Throttle |

| | | |
|--------|---------------------------------------|--------------------|
| WU-OC | Warm Up Oxidation Catalytic Converter | - |
| WU-TWC | Warm Up Three-Way Catalytic Converter | Manifold Converter |
| 3GR | Third Gear | - |
| 4GR | Fourth Gear | - |

PREPARATION

| | |
|---------------------------------------|------|
| MANUAL TRANSMISSION/TRANSAXLE | 02-1 |
| PREPARATION | 02-1 |


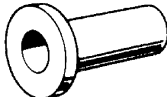

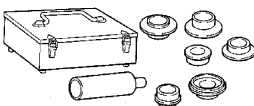

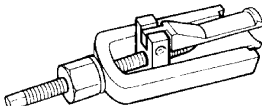
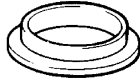
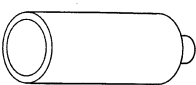
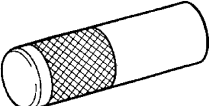

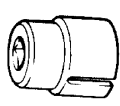
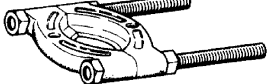


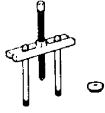
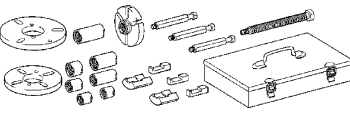



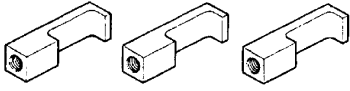

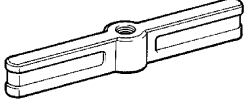
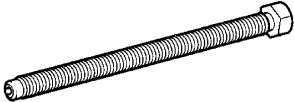

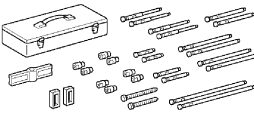
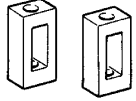

MANUAL TRANSMISSION/TRANSAXLE

PREPARATION

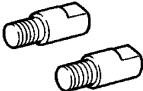
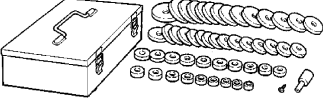











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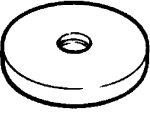
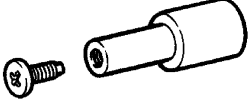
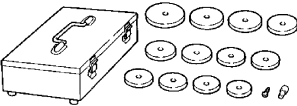

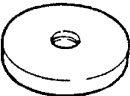

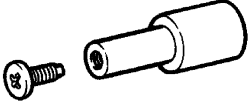
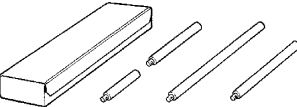




SST

| | | | |
|---|---------------|--|--|
|  | 09222-30010 | Connecting Rod Bushing Remover & Replacer | SHIFT LEVER SHAFT HOUSING ASSY(M550) |
|  | 09309-36010 | Transmission Rear Bearing Replacer | MANUAL TRANSMISSION ASSY(M550) |
|  | 09316-20011 | Transfer Bearing Replacer | OUTPUT SHAFT ASSY(M550) COUNTER GEAR ASSY(M550) |
|  | 09316-60011 | Transmission & Transfer Bearing Replacer | INPUT SHAFT ASSY(M550) COUNTER GEAR ASSY(M550) |
|  | (09316-00011) | Replacer Pipe | INPUT SHAFT ASSY(M550) COUNTER GEAR ASSY(M550) |
|  | 09319-60020 | Output Shaft Needle Roller Bearing Remover | MANUAL TRANSMISSION ASSY(M550) |
|  | 09502-12010 | Differential Bearing Replacer | COUNTER GEAR ASSY(M550) |
|  | 09513-36040 | Rear Axle Bearing Replacer | COUNTER GEAR ASSY(M550) |
|  | 09608-06041 | Front Hub Inner Bearing Cone Replacer | COUNTER GEAR ASSY(M550) |
|  | 09617-28010 | Worm Bearing Adjusting Screw Lock Nut Wrench | MANUAL TRANSMISSION ASSY(M550) |
|  | 09817-16011 | Back-up Light Switch Tool | MANUAL TRANSMISSION ASSY(M550) |
|  | 09950-00020 | Bearing Remover | INPUT SHAFT ASSY(M550) COUNTER GEAR ASSY(M550) |


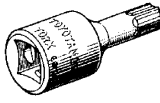
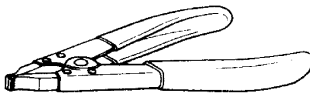
| | | | | |
|---|---------------|----------------------------|---|--------------|
|  | 09950-00030 | Bearing Remover Attachment | COUNTER GEAR ASSY(M550) | |
|  | 09950-30012 | Puller A Set | MANUAL ASSY(M550) | TRANSMISSION |
|  | (09951-03010) | Upper Plate | MANUAL ASSY(M550) | TRANSMISSION |
|  | (09953-03010) | Center Bolt | MANUAL ASSY(M550) | TRANSMISSION |
|  | (09954-03010) | Arm | MANUAL ASSY(M550) | TRANSMISSION |
|  | (09955-03021) | Claw No.2 | MANUAL ASSY(M550) | TRANSMISSION |
|  | 09950-40011 | Puller B Set | MANUAL ASSY(M550) COUNTER GEAR ASSY(M550) | TRANSMISSION |
|  | (09951-04020) | Hanger 200 | MANUAL ASSY(M550) | TRANSMISSION |
|  | (09953-04030) | Center Bolt 200 | MANUAL ASSY(M550) | TRANSMISSION |
|  | (09957-04010) | Attachment | MANUAL ASSY(M550) COUNTER GEAR ASSY(M550) | TRANSMISSION |
|  | 09950-50013 | Puller C Set | MANUAL ASSY(M550) | TRANSMISSION |
|  | (09952-05010) | Slide Arm | MANUAL ASSY(M550) | TRANSMISSION |
|  | (09954-05021) | Claw No.2 | MANUAL ASSY(M550) | TRANSMISSION |

PREPARATION - MANUAL TRANSMISSION/TRANSAXLE

| | | |
|---|----------------------------|--|
|  | (09955-05010) Adapter No.1 | MANUAL TRANSMISSION ASSY(M550) |
|  | 09950-60010 Replacer Set | MANUAL TRANSMISSION ASSY(M550) INPUT SHAFT ASSY(M550) OUTPUT SHAFT ASSY(M550) COUNTER GEAR ASSY(M550) SHIFT LEVER SHAFT HOUSING ASSY(M550) |
|  | (09951-00180) Replacer 18 | COUNTER GEAR ASSY(M550) |
|  | (09951-00200) Replacer 20 | MANUAL TRANSMISSION ASSY(M550) |
|  | (09951-00290) Replacer 29 | OUTPUT SHAFT ASSY(M550) |
|  | (09951-00300) Replacer 30 | COUNTER GEAR ASSY(M550) |
|  | (09951-00310) Replacer 31 | SHIFT LEVER SHAFT HOUSING ASSY(M550) |
|  | (09951-00330) Replacer 33 | MANUAL TRANSMISSION ASSY(M550) |
|  | (09951-00350) Replacer 35 | INPUT SHAFT ASSY(M550) |
|  | (09951-00370) Replacer 37 | COUNTER GEAR ASSY(M550) |
|  | (09951-00470) Replacer 47 | MANUAL TRANSMISSION ASSY(M550) |
|  | (09951-00480) Replacer 48 | MANUAL TRANSMISSION ASSY(M550) |
|  | (09951-00590) Replacer 59 | MANUAL TRANSMISSION ASSY(M550) |

| | | | |
|---|-------------------------------|---|--------------|
|  | (09951-00610) Replacer 61 | MANUAL ASSY(M550) | TRANSMISSION |
|  | (09952-06010) Adapter | MANUAL ASSY(M550) COUNTER GEAR ASSY(M550) | TRANSMISSION |
|  | 09950-60020 Replacer Set No.2 | MANUAL ASSY(M550) | TRANSMISSION |
|  | (09951-00680) Replacer 68 | MANUAL ASSY(M550) | TRANSMISSION |
|  | (09951-00750) Replacer 75 | MANUAL ASSY(M550) | TRANSMISSION |
|  | (09951-00890) Replacer 89 | MANUAL ASSY(M550) | TRANSMISSION |
|  | (09952-06010) Adapter | MANUAL ASSY(M550) COUNTER GEAR ASSY(M550) | TRANSMISSION |
|  | 09950-70010 Handle Set | MANUAL ASSY(M550) INPUT SHAFT ASSY(M550) OUTPUT SHAFT ASSY(M550) COUNTER GEAR ASSY(M550) SHIFT LEVER SHAFT HOUSING ASSY(M550) | TRANSMISSION |
|  | (09951-07100) Handle 100 | MANUAL ASSY(M550) INPUT SHAFT ASSY(M550) OUTPUT SHAFT ASSY(M550) COUNTER GEAR ASSY(M550) SHIFT LEVER SHAFT HOUSING ASSY(M550) | TRANSMISSION |
|  | (09951-07360) Handle 360 | MANUAL ASSY(M550) | TRANSMISSION |
|  | 09951-00700 Replacer 70 | MANUAL ASSY(M550) OUTPUT SHAFT ASSY(M550) | TRANSMISSION |
|  | 09951-01000 Replacer 100 | MANUAL ASSY(M550) | TRANSMISSION |

Recommended Tools

| | | | | |
|---|-------------|-------------------------|----------------------|---|
|  | 09031-00040 | Pin Punch . | MANUAL ASSY(M550) | TRANSMISSION SHIFT LEVER SHAFT HOUSING ASSY(M550) |
|  | 09042-00020 | Torx Socket T40 | MANUAL ASSY(M550) | TRANSMISSION |
|  | 09905-00012 | Snap Ring No.1 Expander | MANUAL ASSY(M550) | TRANSMISSION |

Equipment

| | |
|---|--|
| Aluminum plate | |
| Belt | |
| Brass bar | |
| Chisel | |
| Cylinder gauge | |
| Dial indicator or dial indicator with magnetic base | |
| Feeler gauge | |
| Gear oil | |
| Magnet finger | |
| Micrometer | |
| MP grease | |
| Plastic hammer | |
| Press | |
| Protective tape | |
| Rope or wire | |
| Shop rag | |
| Snapping plier | |
| Socket wrench (50 mm) | |
| Torque wrench | |
| Vernier caliper | |
| Wooden block | |
| Work bench | |

Lubricant

| Item | Capacity | Classification |
|-------------------------|---|------------------|
| Manual transmission oil | | |
| w/o PTO | 2.8 liters (2.96 US qts, 2.46 Imp. qts) | API GL-4 or GL-5 |
| w/ PTO | 3.1 liters (3.28 US qts, 2.73 Imp. qts) | SAE 75W-90 |

SSM (Special Service Materials)

| | | |
|-------------|---|--|
| 08826-00090 | "Seal Packing 1281," THREE BOND 1281 or equivalent (FIPG) | |
| 08833-00080 | Adhesive 1344 THREE BOND 1344 LOCTITE 242 or equivalent | |


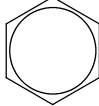
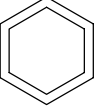
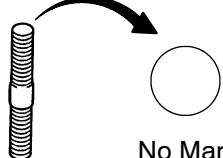
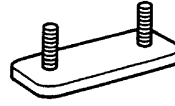

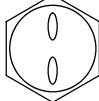
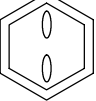

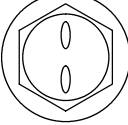
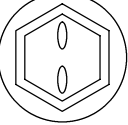
















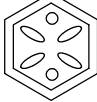
SERVICE SPECIFICATIONS

| | |
|--|------|
| STANDARD BOLT | 03-1 |
| HOW TO DETERMINE BOLT STRENGTH | 03-1 |
| SPECIFIED TORQUE FOR STANDARD BOLTS | 03-2 |
| HOW TO DETERMINE NUT STRENGTH | 03-3 |
| MANUAL TRANSMISSION / | |
| TRANSAXLE | 03-4 |
| SERVICE DATA | 03-4 |
| TORQUE SPECIFICATION | 03-7 |

STANDARD BOLT

HOW TO DETERMINE BOLT STRENGTH

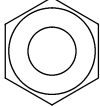
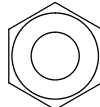
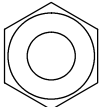
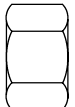

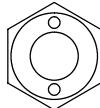
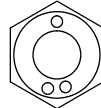
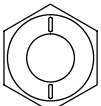
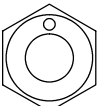
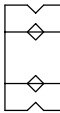
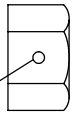

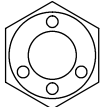

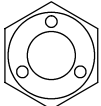
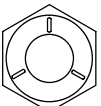
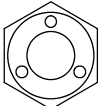
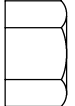

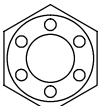

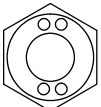
030Y3-06

| Bolt Type | | | | Class |
|---|---|---|---|-------|
| Hexagon Head Bolt | | Stud Bolt | Weld Bolt | |
| Normal Recess Bolt | Deep Recess Bolt | | | |
|   No Mark |  No Mark |  No Mark |  | 4T |
|   |  | | | 5T |
|   w/Washer |  w/Washer |  | | 6T |
|   |   | | | 7T |
|  |  |   | | 8T |
|  |  | | | 9T |
|  |   | | | 10T |
|  |   | | | 11T |

SPECIFIED TORQUE FOR STANDARD BOLTS

| Class | Diameter mm | Pitch mm | Specified torque | | | | | |
|-------|----------------|-------------|-------------------|--------|------------|---------------------|--------|------------|
| | | | Hexagon head bolt | | | Hexagon flange bolt | | |
| | | | N·m | kgf·cm | ft·lbf | N·m | kgf·cm | ft·lbf |
| 4T | 6 | 1 | 5 | 55 | 48 in.·lbf | 6 | 60 | 52 in.·lbf |
| | 8 | 1.25 | 12.5 | 130 | 9 | 14 | 145 | 10 |
| | 10 | 1.25 | 26 | 260 | 19 | 29 | 290 | 21 |
| | 12 | 1.25 | 47 | 480 | 35 | 53 | 540 | 39 |
| | 14 | 1.5 | 74 | 760 | 55 | 84 | 850 | 61 |
| | 16 | 1.5 | 115 | 1,150 | 83 | - | - | - |
| 5T | 6 | 1 | 6.5 | 65 | 56 in.·lbf | 7.5 | 75 | 65 in.·lbf |
| | 8 | 1.25 | 15.5 | 160 | 12 | 17.5 | 175 | 13 |
| | 10 | 1.25 | 32 | 330 | 24 | 36 | 360 | 26 |
| | 12 | 1.25 | 59 | 600 | 43 | 65 | 670 | 48 |
| | 14 | 1.5 | 91 | 930 | 67 | 100 | 1,050 | 76 |
| | 16 | 1.5 | 140 | 1,400 | 101 | - | - | - |
| 6T | 6 | 1 | 8 | 80 | 69 in.·lbf | 9 | 90 | 78 in.·lbf |
| | 8 | 1.25 | 19 | 195 | 14 | 21 | 210 | 15 |
| | 10 | 1.25 | 39 | 400 | 29 | 44 | 440 | 32 |
| | 12 | 1.25 | 71 | 730 | 53 | 80 | 810 | 59 |
| | 14 | 1.5 | 110 | 1,100 | 80 | 125 | 1,250 | 90 |
| | 16 | 1.5 | 170 | 1,750 | 127 | - | - | - |
| 7T | 6 | 1 | 10.5 | 110 | 8 | 12 | 120 | 9 |
| | 8 | 1.25 | 25 | 260 | 19 | 28 | 290 | 21 |
| | 10 | 1.25 | 52 | 530 | 38 | 58 | 590 | 43 |
| | 12 | 1.25 | 95 | 970 | 70 | 105 | 1,050 | 76 |
| | 14 | 1.5 | 145 | 1,500 | 108 | 165 | 1,700 | 123 |
| | 16 | 1.5 | 230 | 2,300 | 166 | - | - | - |
| 8T | 8 | 1.25 | 29 | 300 | 22 | 33 | 330 | 24 |
| | 10 | 1.25 | 61 | 620 | 45 | 68 | 690 | 50 |
| | 12 | 1.25 | 110 | 1,100 | 80 | 120 | 1,250 | 90 |
| 9T | 8 | 1.25 | 34 | 340 | 25 | 37 | 380 | 27 |
| | 10 | 1.25 | 70 | 710 | 51 | 78 | 790 | 57 |
| | 12 | 1.25 | 125 | 1,300 | 94 | 140 | 1,450 | 105 |
| 10T | 8 | 1.25 | 38 | 390 | 28 | 42 | 430 | 31 |
| | 10 | 1.25 | 78 | 800 | 58 | 88 | 890 | 64 |
| | 12 | 1.25 | 140 | 1,450 | 105 | 155 | 1,600 | 116 |
| 11T | 8 | 1.25 | 42 | 430 | 31 | 47 | 480 | 35 |
| | 10 | 1.25 | 87 | 890 | 64 | 97 | 990 | 72 |
| | 12 | 1.25 | 155 | 1,600 | 116 | 175 | 1,800 | 130 |

HOW TO DETERMINE NUT STRENGTH

| Nut Type | | Class | |
|---|---|---|-----------------------|
| Present Standard Hexagon Nut | Old Standard Hexagon Nut | | |
| | Cold Forging Nut | | Cutting Processed Nut |
|  No Mark | | | 4N |
|  No Mark (w/Washer) |  No Mark (w/Washer) |  No Mark | 5N (4T) |
|    | | | 6N |
| |   |   * | 7N (5T) |
|   | | | 8N |
|   |   |  No Mark | 10N (7T) |
|   | | | 11N |
|   | | | 12N |

*: Nut with 1 or more marks on one side surface of the nut.

HINT:

Use the nut with the same number of the nut strength classification or the greater than the bolt strength classification number when tightening parts with a bolt and nut.

Example: Bolt = 4T

Nut = 4N or more

MANUAL TRANSMISSION / TRANSAXLE

030ZD-04

SERVICE DATA

| MANUAL TRANSMISSION ASSY | | |
|--|--|--|
| Reverse idler gear thrust clearance | STD | 0.10 to 0.62 mm (0.0039 to 0.0244 in.) |
| | Max. | 0.62 mm (0.0244 in.) |
| Reverse idler gear radial clearance | STD | 0.015 to 0.059 mm (0.0006 to 0.0023 in.) |
| | Max. | 0.059 mm (0.0023 in.) |
| Reverse idler gear inside diameter | STD | 35.015 to 35.036 mm (1.3785 to 1.3793 in.) |
| | Max. | 35.036 mm (1.3793 in.) |
| Reverse idler gear shaft outer diameter | STD | 27.987 to 28.00 mm (1.1018 to 1.1024 in.) |
| | Min. | 27.987 mm (1.1018 in.) |
| Front bearing retainer oil seal | Drive in depth | 13.8 to 14.6 mm (0.5433 to 0.5750 in.) |
| Synchronizer ring to gear clearance (counter shaft) | 4th gear STD | 0.78 to 1.62 mm (0.0307 to 0.0643 in.) |
| | Min | 0.78 mm (0.0307 in.) |
| Shift lever slotted pin Drive in depth | Shift fork shaft No.1 | 0 to 1.0 mm (0 to 0.039 in.) |
| | Shift fork shaft No.2 | 0 to 1.0 mm (0 to 0.039 in.) |
| | Shift fork shaft No.4 | 0 to 1.0 mm (0 to 0.039 in.) |
| | | |
| Shift & select lever shaft bimetal formed bush | Drive in depth | 149.0 to 150.0 mm (5.866 to 5.906 in.) |
| Select lever oil seal | Drive in depth | 0 to 1.0 mm (0 to 0.039 in.) |
| Output shaft tapered roller bearing preload | at starting | 0.3 to 0.8 N·m (3.06 to 8.16 kgf·cm, 2.66 to 7.10 in.·lbf) |
| Rear bearing retainer oil seal | Drive in depth | 0 to 0.5 mm (0 to 0.0197 in.) |
| INPUT SHAFT ASSY | | |
| 5th gear thrust clearance | STD | 0.10 to 0.35 mm (0.0039 to 0.0138 in.) |
| | Max. | 0.35 mm (0.0138 in.) |
| 5th gear radial clearance | STD | 0.015 to 0.068 mm (0.0006 to 0.0027 in.) |
| | Max. | 0.068 mm (0.0027 in.) |
| Input shaft runout | Max. | 0.015 mm (0.0006 in.) |
| Input shaft journal diameter | A: STD | 47.002 to 47.018 mm (1.8505 to 1.8511 in.) |
| | Min. | 47.002 mm (1.8505 in.) |
| | B: STD | 47.984 to 48.000 mm (1.8891 to 1.8898 in.) |
| | Min. | 47.984 mm (1.8891 in.) |
| | C: STD | 38.118 to 38.130 mm (1.5007 to 1.5012 in.) |
| | Min. | 38.118 mm (1.5007 in.) |
| 5th gear inside diameter | STD | 55.015 to 55.040 mm (2.1659 to 2.1669 in.) |
| | Max. | 55.040 mm (2.1669 in.) |
| 5th gear thrust washer | STD | 4.95 to 5.05 mm (0.1945 to 0.2004 in.) |
| | Min. | 4.95 mm (0.1945 in.) |
| Synchronizer ring to gear clearance (counter shaft) | 5th gear STD | 0.78 to 1.62 mm (0.0307 to 0.0643 in.) |
| | Min. | 0.78 mm (0.0307 in.) |
| Wide of the hub sleeve - Thickness of the gear shift fork | No.3 | 0.15 to 0.26 mm (0.0059 to 0.0102 in.) |
| | | |
| Input shaft front bearing snap ring thickness | Mark | |
| | A | 3.00 to 3.05 mm (0.1181 to 0.1201 in.) |
| | B | 3.05 to 3.10 mm (0.1201 to 0.1220 in.) |
| | C | 3.10 to 3.15 mm (0.1220 to 0.1240 in.) |
| | D | 3.15 to 3.20 mm (0.1240 to 0.1260 in.) |
| | E | 3.20 to 3.25 mm (0.1260 to 0.1280 in.) |
| F | 3.25 to 3.30 mm (0.1280 to 0.1300 in.) | |

SERVICE SPECIFICATIONS - MANUAL TRANSMISSION / TRANSAXLE

| | | |
|--|--------|--|
| Input shaft snap ring thickness | Mark | |
| Clutch hub shaft No.3 | A | 2.60 to 2.65 mm (0.1024 to 0.1043 in.) |
| | B | 2.65 to 2.70 mm (0.1043 to 0.1063 in.) |
| | C | 2.70 to 2.75 mm (0.1063 to 0.1083 in.) |
| | D | 2.75 to 2.80 mm (0.1083 to 0.1102 in.) |
| | E | 2.80 to 2.85 mm (0.1102 to 0.1122 in.) |
| | F | 2.85 to 2.90 mm (0.1122 to 0.1142 in.) |
| OUTPUT SHAFT ASSY | | |
| Inside diameter of the output shaft bearing race | STD | 54.170 to 54.187 mm (2.1327 to 2.1333 in.) |
| | Max. | 54.187 mm (2.1333 in.) |
| Synchronizer ring to gear clearance (output shaft) | STD | 0.78 to 1.62 mm (0.0307 to 0.0638 in.) |
| | Min. | 0.78 mm (0.0307 in.) |
| COUNTER GEAR ASSY | | |
| Reverse gear thrust clearance | STD | 0.10 to 0.45 mm (0.0039 to 0.0177 in.) |
| | Max. | 0.45 mm (0.0177 in.) |
| Reverse gear radial clearance | STD | 0.15 to 0.068 mm (0.0006 to 0.0027 in.) |
| | Max. | 0.068 mm (0.0027 in.) |
| 1st gear thrust clearance | STD | 0.10 to 0.45 mm (0.0039 to 0.0177 in.) |
| | Max. | 0.45 mm (0.0177 in.) |
| 1st gear radial clearance | STD | 0.15 to 0.068 mm (0.0006 to 0.0027 in.) |
| | Max. | 0.068 mm (0.0027 in.) |
| 3rd gear thrust clearance | STD | 0.10 to 0.45 mm (0.0039 to 0.0177 in.) |
| | Max. | 0.45 mm (0.0177 in.) |
| 3rd gear radial clearance | STD | 0.15 to 0.068 mm (0.0006 to 0.0027 in.) |
| | Max. | 0.068 mm (0.0027 in.) |
| 2nd gear thrust clearance | STD | 0.10 to 0.35 mm (0.0039 to 0.0138 in.) |
| | Max. | 0.35 mm (0.0138 in.) |
| 2nd gear radial clearance | STD | 0.15 to 0.068 mm (0.0006 to 0.0027 in.) |
| | Max. | 0.068 mm (0.0027 in.) |
| Counter gear shaft runout | Max. | 0.015 mm (0.0006 in.) |
| Counter gear shaft journal diameter | A: STD | 43.484 to 43.500 mm (1.7120 to 1.7126 in.) |
| | Max. | 43.500 mm (1.7126 in.) |
| | B: STD | 48.984 to 49.000 mm (1.9285 to 1.9291 in.) |
| | Max. | 49.000 mm (1.9291 in.) |
| | C: STD | 53.984 to 54.000 mm (2.1253 to 2.1260 in.) |
| | Max. | 54.000 mm (2.1260 in.) |
| | D: STD | 53.984 to 54.000 mm (2.1253 to 2.1260 in.) |
| | Max. | 54.000 mm (2.1260 in.) |
| Reverse gear inside diameter | STD | 50.515 to 50.540 mm (1.9888 to 1.9898 in.) |
| | Max. | 50.540 mm (1.9898 in.) |
| 1st gear inside diameter | STD | 55.015 to 55.040 mm (2.2053 to 2.2063 in.) |
| | Max. | 55.040 mm (2.2063 in.) |
| 2nd gear inside diameter | STD | 61.015 to 61.040 mm (2.4022 to 2.4031 in.) |
| | Max. | 61.040 mm (2.4031 in.) |
| 3rd gear inside diameter | STD | 61.015 to 61.040 mm (2.4022 to 2.4031 in.) |
| | Max. | 61.040 mm (2.4031 in.) |
| 2nd gear thrust washer thickness | STD | 5.45 to 5.55 mm (0.2146 to 0.2185 in.) |
| | Min. | 5.45 mm (0.2146 in.) |
| 3rd gear thrust washer thickness | STD | 11.45 to 11.55 mm (0.4508 to 0.4547 in.) |
| | Min. | 11.45 mm (0.4508 in.) |

| | | | |
|---|------------------------|------|--|
| Synchronizer ring to gear clearance (counter shaft) | 1st gear | STD | 1.10 to 2.10 mm (0.0433 to 0.0822 in.) |
| | | Min. | 1.10 mm (0.0433 in.) |
| | 2nd gear | STD | 1.10 to 2.10 mm (0.0433 to 0.0822 in.) |
| | | Min. | 1.10 mm (0.0433 in.) |
| | 3rd gear | STD | 0.78 to 1.62 mm (0.0307 to 0.0643 in.) |
| | | Min. | 0.78 mm (0.0307 in.) |
| | Reverse gear | STD | 0.78 to 1.62 mm (0.0307 to 0.0643 in.) |
| | | Min. | 0.78 mm (0.0307 in.) |
| Wide of the hub sleeve | | | |
| - Thickness of the gear shift fork | No.1 | | 0.25 to 0.85 mm (0.0098 to 0.0335 in.) |
| | No.2 | | 0.25 to 0.85 mm (0.0098 to 0.0335 in.) |
| Transmission clutch hub shaft snap ring No.2 | Mark | | |
| | 1 | | 2.40 to 2.45 mm (0.0945 to 0.0965 in.) |
| | 2 | | 2.45 to 2.50 mm (0.0965 to 0.0984 in.) |
| | 3 | | 2.50 to 2.55 mm (0.0984 to 0.1004 in.) |
| | 4 | | 2.55 to 2.60 mm (0.1004 to 0.1024 in.) |
| | 5 | | 2.60 to 2.65 mm (0.1024 to 0.1043 in.) |
| | 6 | | 2.65 to 2.70 mm (0.1043 to 0.1063 in.) |
| 3rd gear thrust washer hole snap ring | Mark | | |
| | 1 | | 2.40 to 2.45 mm (0.0945 to 0.0965 in.) |
| | 2 | | 2.45 to 2.50 mm (0.0965 to 0.0984 in.) |
| | 3 | | 2.50 to 2.55 mm (0.0984 to 0.1004 in.) |
| | 4 | | 2.55 to 2.60 mm (0.1004 to 0.1024 in.) |
| | 5 | | 2.60 to 2.65 mm (0.1024 to 0.1043 in.) |
| | 6 | | 2.65 to 2.70 mm (0.1043 to 0.1063 in.) |
| Transmission clutch hub shaft snap ring No.1 | Mark | | |
| | A | | 2.40 to 2.45 mm (0.0945 to 0.0965 in.) |
| | B | | 2.45 to 2.50 mm (0.0965 to 0.0984 in.) |
| | C | | 2.50 to 2.55 mm (0.0984 to 0.1004 in.) |
| | D | | 2.55 to 2.60 mm (0.1004 to 0.1024 in.) |
| | E | | 2.60 to 2.65 mm (0.1024 to 0.1043 in.) |
| | F | | 2.65 to 2.70 mm (0.1043 to 0.1063 in.) |
| Counter gear front bearing hole snap ring | Mark | | |
| | A | | 2.40 to 2.45 mm (0.0945 to 0.0965 in.) |
| | B | | 2.45 to 2.50 mm (0.0965 to 0.0984 in.) |
| | C | | 2.50 to 2.55 mm (0.0984 to 0.1004 in.) |
| | D | | 2.55 to 2.60 mm (0.1004 to 0.1024 in.) |
| | E | | 2.60 to 2.65 mm (0.1024 to 0.1043 in.) |
| | F | | 2.65 to 2.70 mm (0.1043 to 0.1063 in.) |
| SHIFT LEVER SHAFT HOUSING ASSY | | | |
| Control shaft cover bimetal formed bush | Drive in depth | | 9.0 to 10.0 mm (0.3543 to 0.3937 in.) |
| Control shaft cover oil seal | Drive in depth | | 0 to 1.0 mm (0 to 0.0394 in.) |
| Select lever shaft slotted pin | | | |
| Drive in depth | Select inner head | | 0 to 1.0 mm (0 to 0.039 in.) |
| | Shift lever inner No.1 | | 0 to 1.0 mm (0 to 0.039 in.) |

TORQUE SPECIFICATION

| Part Tightened | N·m | kgf·cm | ft·lbf |
|--|-----|--------|------------|
| Front bearing retainer x Transmission case | 17 | 173 | 13 |
| Gear shift fork No.3 x Shift fork shaft No.3 | 34 | 350 | 25 |
| Shift detent ball plug x Transmission case | 19 | 194 | 14 |
| Shift lever inner x Clutch housing | 23 | 235 | 17 |
| Transmission oil receiver No.1 x Transmission case | 23 | 235 | 17 |
| Transmission oil separator x Transmission case | 23 | 235 | 17 |
| Clutch housing x Transmission | 37 | 380 | 27 |
| Reverse idler gear shaft bolt x Transmission case | 28 | 286 | 21 |
| Shift lever shaft housing assy x Transmission case | 17 | 173 | 13 |
| Shift lever shaft knock pin x Nut | 7.8 | 80 | 69 in.·lbf |
| Counter gear assy x Counter gear lock nut | 132 | 1,346 | 97 |
| Transmission rear bearing retainer x Transmission case | 37 | 377 | 27 |
| Speedometer driven gear x Transmission rear bearing retainer | 11 | 112 | 8 |
| Power take-off cover x Transmission case | 14 | 143 | 10 |
| Filler plug x Transmission case | 37 | 377 | 27 |
| Drain plug x Transmission case | 37 | 377 | 27 |
| Exhaust brake neutral switch assy x Transmission case | 39 | 400 | 29 |
| Back-up light switch x Transmission case | 44 | 450 | 33 |

MANUAL TRANSMISSION/TRANSAXLE

| | |
|--------------------------------------|-------|
| MANUAL TRANSMISSION SYSTEM | |
| (M550) | 41-1 |
| PROBLEM SYMPTOMS TABLE | 41-1 |
| MANUAL TRANSMISSION ASSY (M550) | 41-2 |
| COMPONENTS | 41-2 |
| OVERHAUL | 41-6 |
| INPUT SHAFT ASSY (M550) | 41-32 |
| COMPONENTS | 41-32 |
| OVERHAUL | 41-33 |
| OUTPUT SHAFT ASSY (M550) | 41-40 |
| COMPONENTS | 41-40 |
| OVERHAUL | 41-41 |
| COUNTER GEAR ASSY (M550) | 41-44 |
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| SHIFT LEVER SHAFT HOUSING ASSY | |
| (M550) | 41-64 |
| COMPONENTS | 41-64 |
| OVERHAUL | 41-65 |

MANUAL TRANSMISSION SYSTEM (M550)

410CS-02

PROBLEM SYMPTOMS TABLE

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

| Symptom | Suspected Area | See Page |
|---------------------------------|--|---------------------------------|
| Noise | 1. Oil (Level low) | ★ |
| | 2. Oil (Wrong) | ★ |
| | 3. Gear (Worn or damaged) | 41-6 41-33 41-41 41-46 |
| | 4. Bearing (Worn or damaged) | 41-6 41-33 41-41 41-46 |
| Oil leakage | 1. Oil (Level too high) | ★ |
| | 2. Gasket (Damaged) | 41-6 |
| | 3. Oil seal (Worn or damaged) | 41-6 |
| Hard to shift or will not shift | 1. Synchronizer ring (Worn or damaged) | 41-6 41-33 41-41 41-46 |
| | 2. Shift key spring (Damaged) | 41-6 |
| Jumps out of gear | 1. Locking ball spring (Damaged) | 41-6 |
| | 2. Shift fork (Worn) | 41-6 |
| | 3. Gear (Worn or damaged) | 41-6 41-33 41-41 41-46 |
| | 4. Bearing (Worn or damaged) | 41-6 41-33 41-41 41-46 |

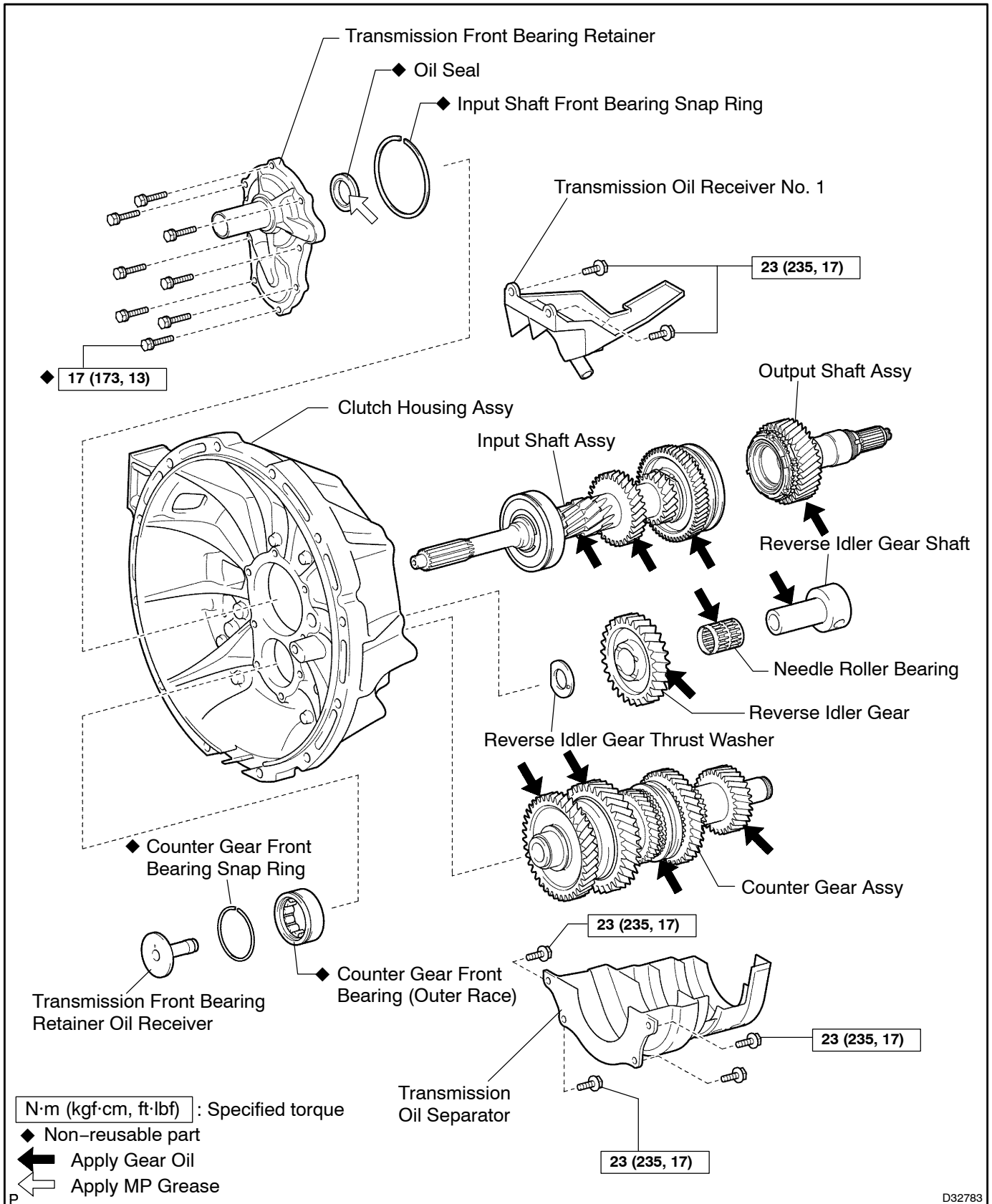
HINT:

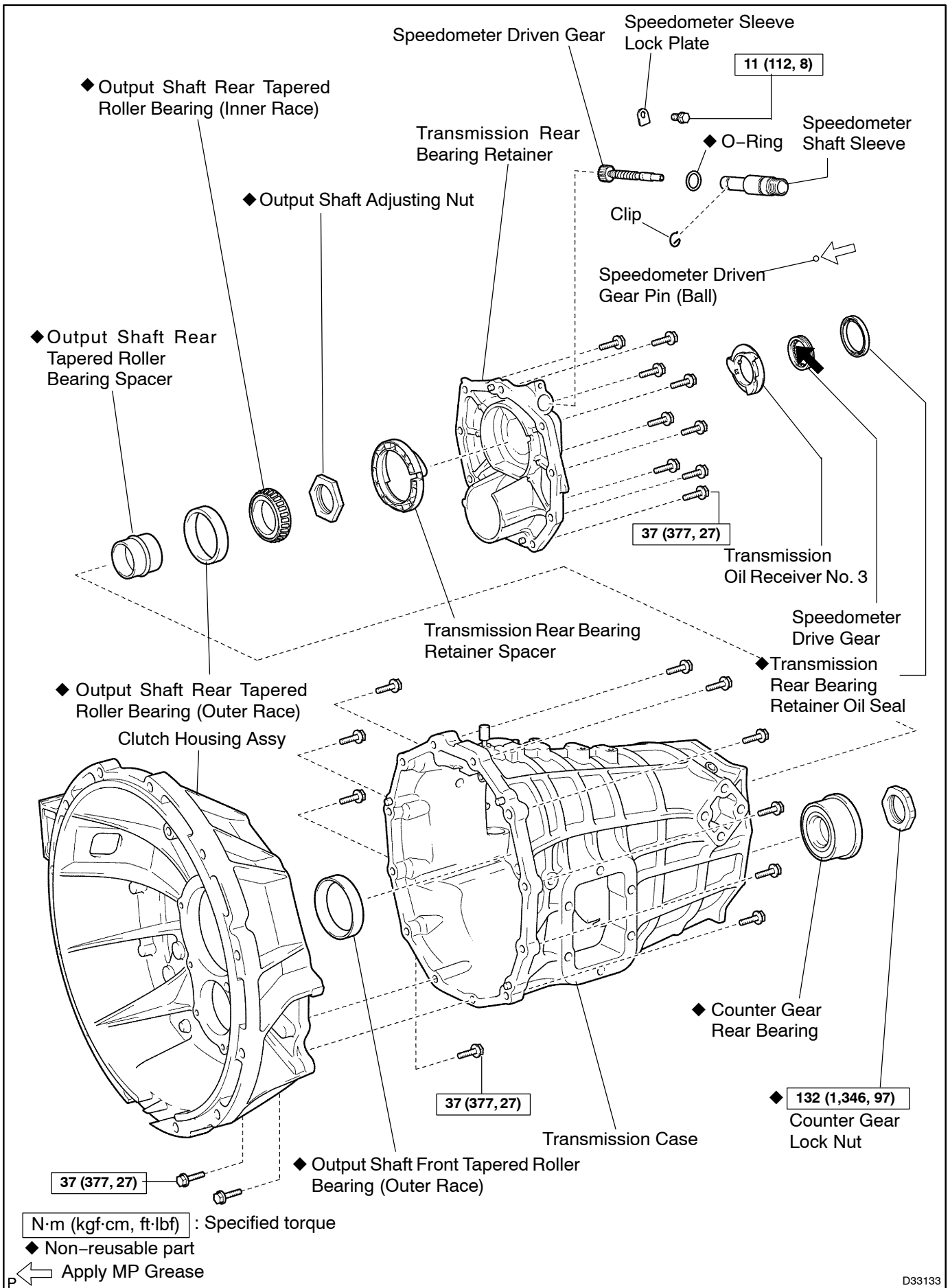
★: See Pub. No. S1-YXZE10A, page 41-1

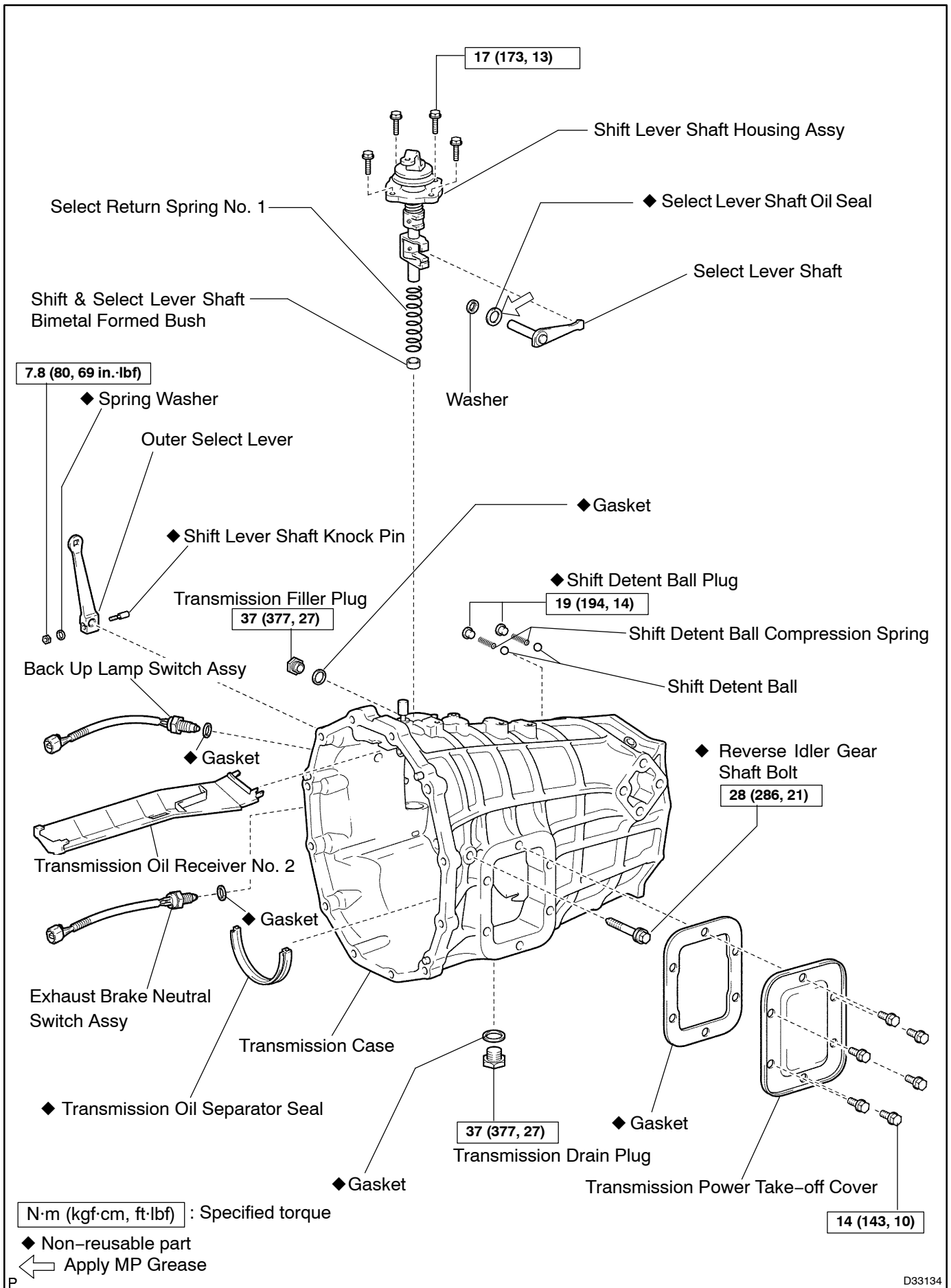
MANUAL TRANSMISSION ASSY (M550)

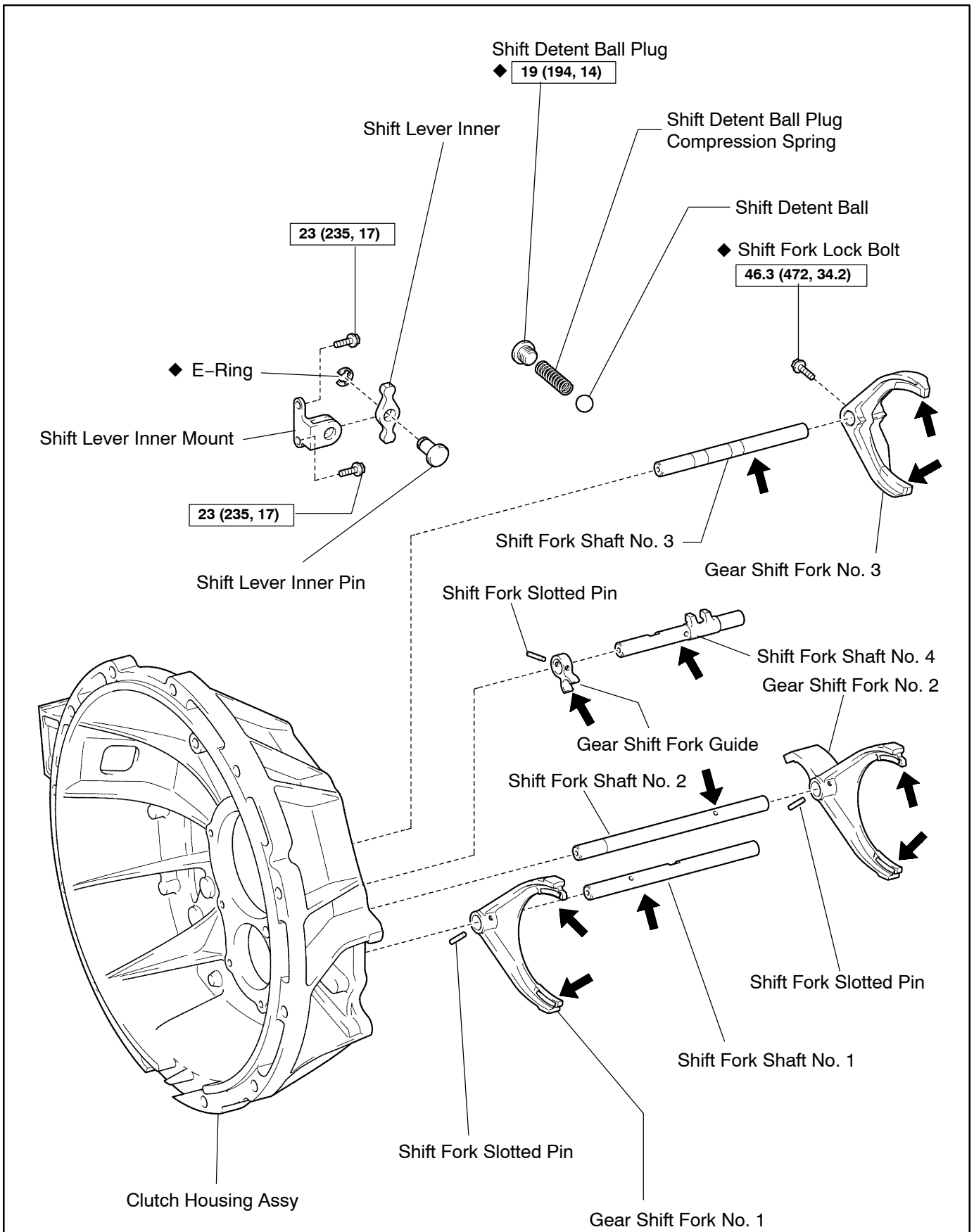
410HD-01

COMPONENTS









N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

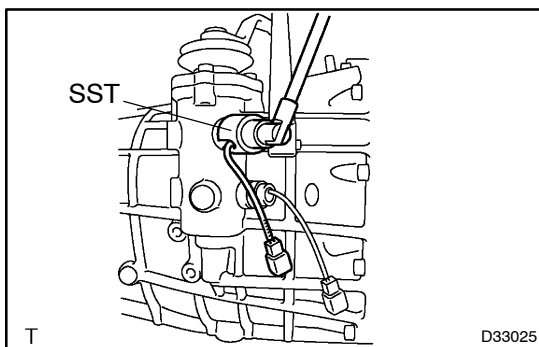
← Apply Gear Oil

OVERHAUL

NOTICE:

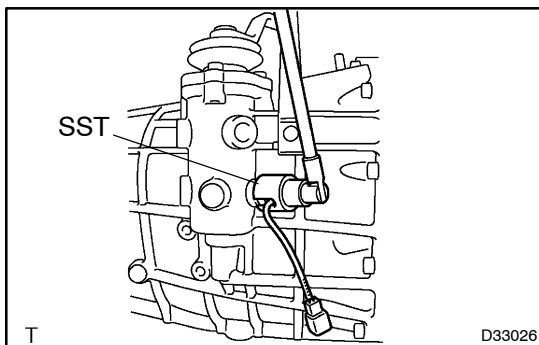
When working with FIPG (seal packing) material, you must observe the following items.

- Using a razor blade and gasket scraper, remove all old FIPG material from the gasket surfaces.
- Thoroughly clean all components.
- Clean both sealing surfaces with non-residue solvent.
- Apply FIPG to an approximately 1.2 mm (0.047 in.) wide bead of FIPG material along the sealing surface.
- Parts must be assembled within 10 minutes after application of FIPG material. Otherwise, the FIPG material must be removed and reapplied.



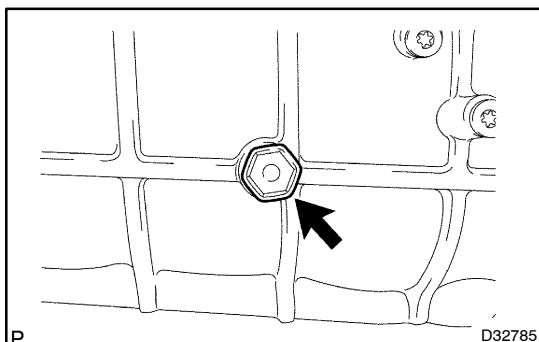
1. REMOVE BACK UP LAMP SWITCH ASSY

- (a) Using SST, remove the switch and gasket.
SST 09817-16011



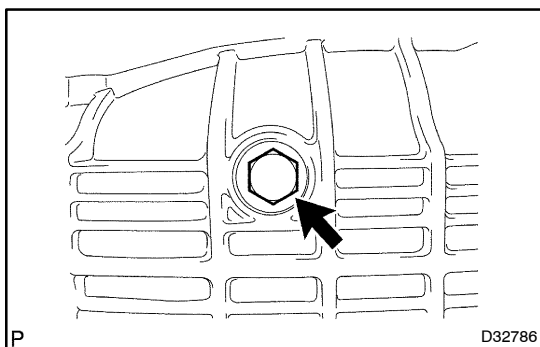
2. REMOVE EXHAUST BRAKE NEUTRAL SWITCH ASSY

- (a) Using SST, remove the switch and gasket.
SST 09817-16011



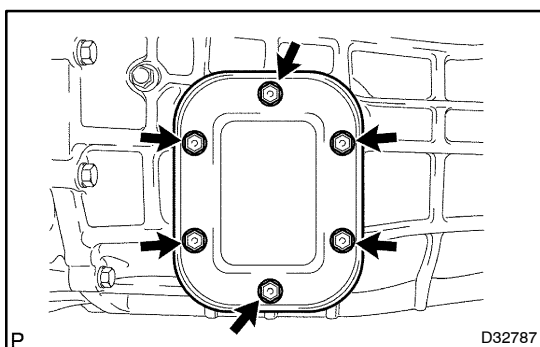
3. REMOVE TRANSMISSION FILLER PLUG

- (a) Remove the filler plug and gasket.



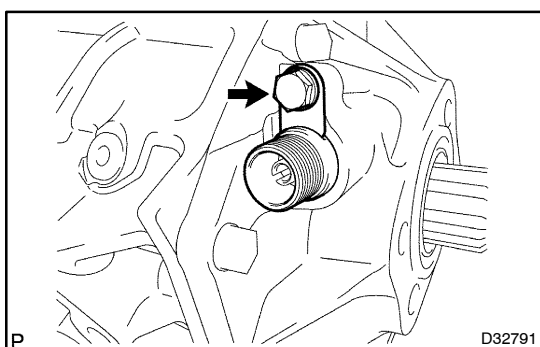
4. REMOVE TRANSMISSION DRAIN PLUG

- (a) Remove the drain plug and gasket.



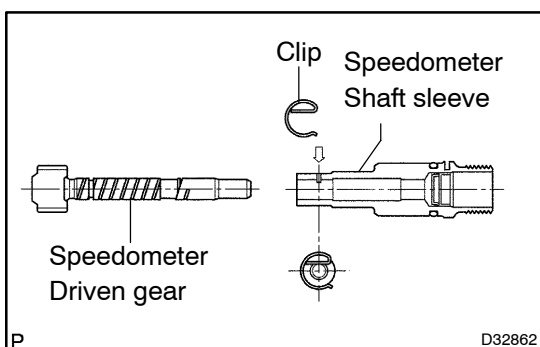
5. REMOVE MANUAL TRANSMISSION POWER TAKE-OFF COVER

- (a) Remove the 6 bolts, cover and gasket.

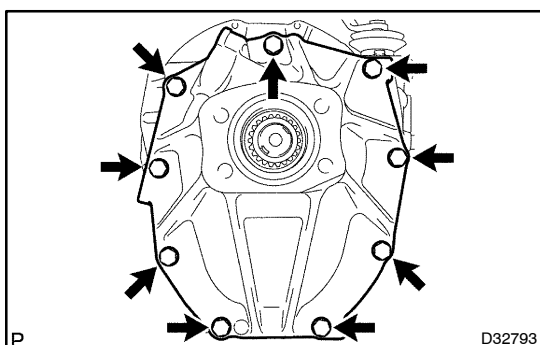


6. REMOVE SPEEDOMETER DRIVEN GEAR SUB-ASSY

- (a) Remove the bolt, lock plate and driven gear.

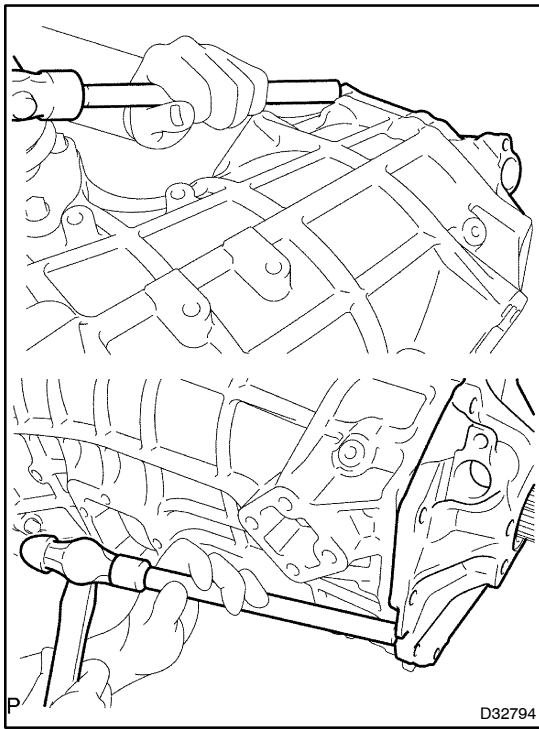


- (b) Remove the clip from the speedometer sleeve.
 (c) Remove the driven gear from the sleeve.
 (d) Remove the O-ring from the sleeve.
 (e) Check the teeth of the speedometer driven gear.
 If the driver gear is damaged, replace it.



7. REMOVE TRANSMISSION REAR BEARING RETAINER

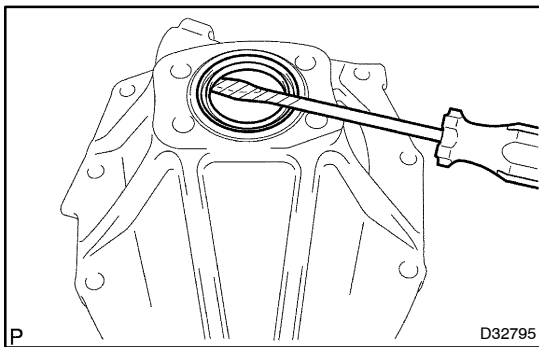
- (a) Remove the 9 bolts.



- (b) Using a brass bar and hammer, carefully tap out the bearing retainer.

HINT:

Make the brass bar touched the rib portion of the case.

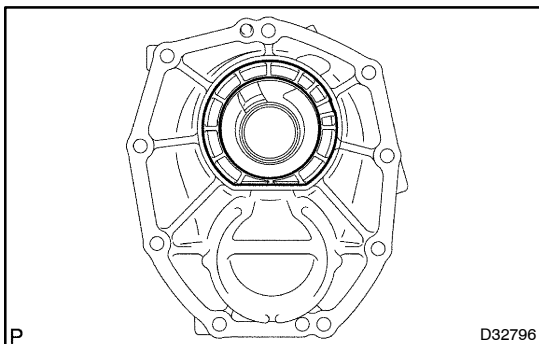


8. REMOVE TRANSMISSION REAR BEARING RETAINER OIL SEAL

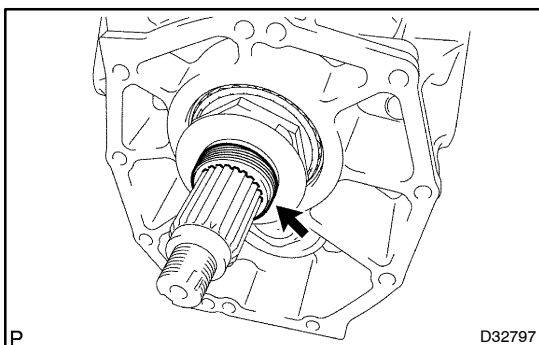
- (a) Using a screwdriver, pry out the oil seal.

HINT:

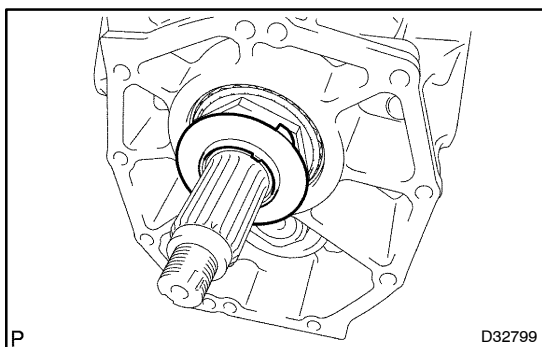
Tap the screwdriver tip before use.



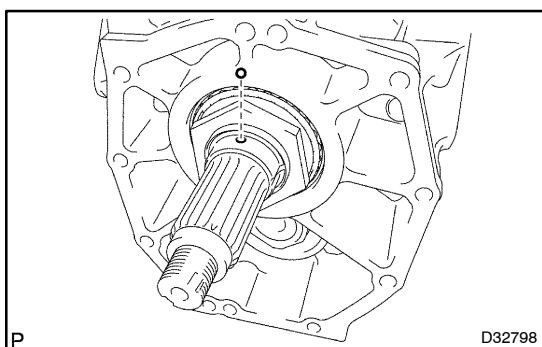
9. REMOVE TRANSMISSION REAR BEARING RETAINER SPACER



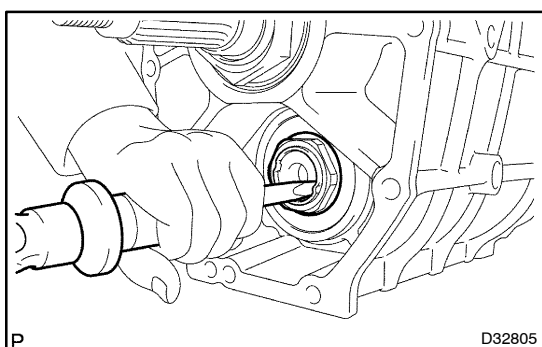
10. REMOVE SPEEDOMETER DRIVE GEAR



11. REMOVE TRANSMISSION OIL RECEIVER NO. 3

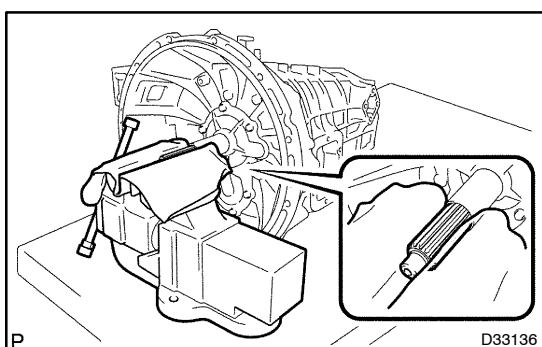


12. REMOVE SPEEDOMETER DRIVE GEAR PIN (BALL)

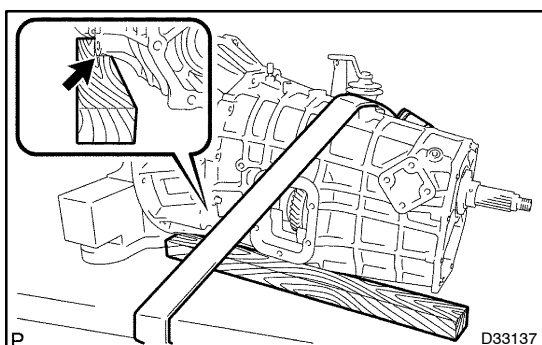


13. REMOVE COUNTER GEAR LOCK NUT

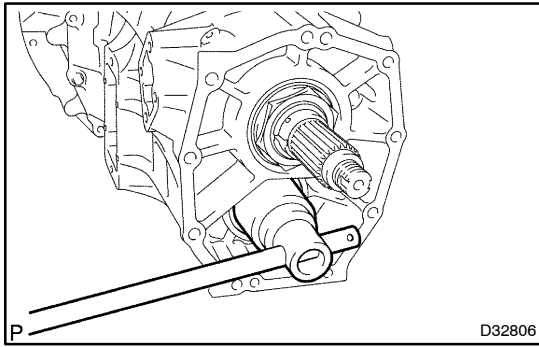
(a) Using a chisel and hammer, unstake the lock nut.



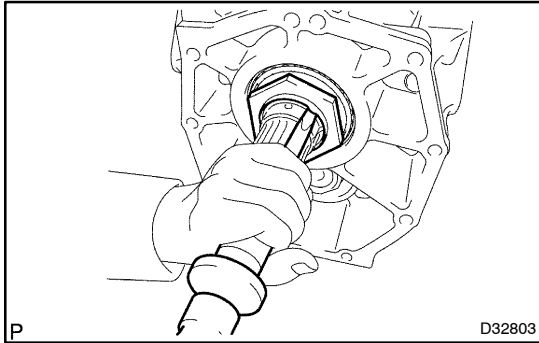
(b) Fix the input shaft's spline part through 2 protective aluminum plates and a shop rag in a vise, and move the gear to the 4th place.



(c) Using 2 belts and a wooden block, fasten the transmission to the work bench.

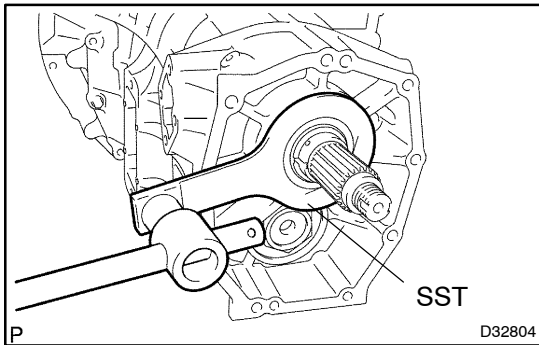


- (d) Using a 50 mm socket wrench, remove the lock nut from the counter gear.

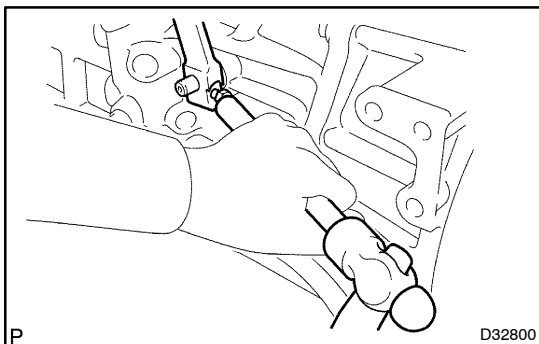


14. REMOVE OUTPUT SHAFT ADJUSTING NUT

- (a) Using a chisel and hammer, unstake the nut.



- (b) Using SST, remove the nut from the output shaft.
SST 09617-28010
- (c) Remove the 2 belts and wooden block from the transmission.
- (d) Move the gear back to neutral and remove the input shaft spline part from the vise.



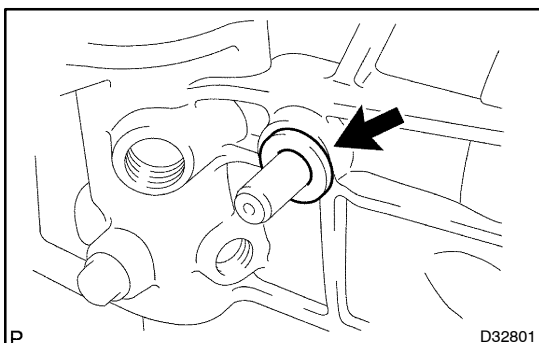
15. REMOVE OUTER SELECT LEVER

- (a) Remove the nut and spring washer from the select lever shaft knock pin.
- (b) Install the nut to the select lever shaft knock pin.
- (c) Using a brass bar and hammer, tap the nut and disengage the knock pin from the outer select lever.

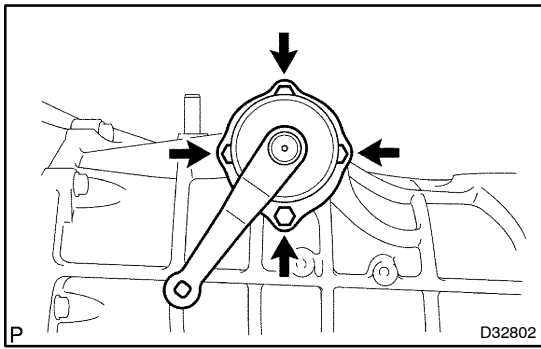
NOTICE:

Do not directly tap the knock pin.

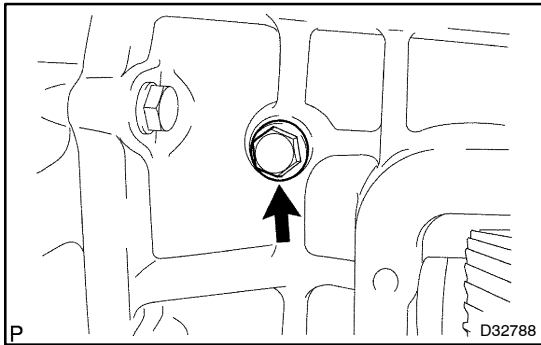
- (d) Remove the select lever from the select lever shaft.



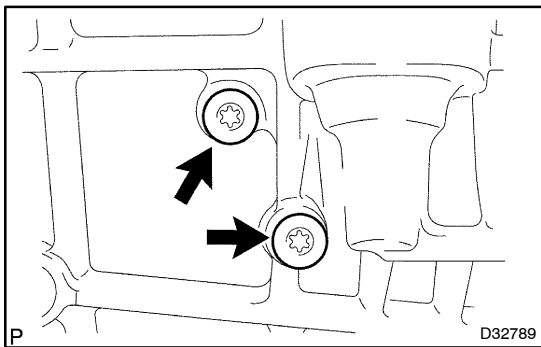
- (e) Remove the washer from the select lever shaft.



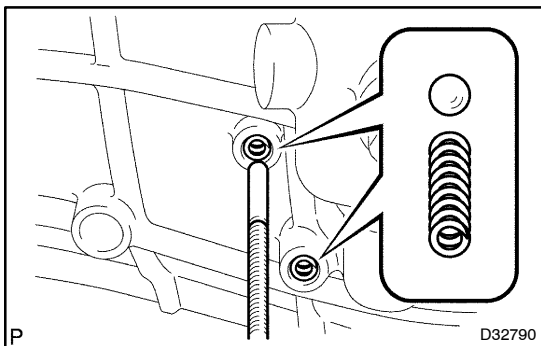
- 16. REMOVE SHIFT LEVER SHAFT HOUSING ASSY**
 (a) Remove the 4 bolts, shift housing and select return spring from the transmission case.



- 17. REMOVE REVERSE IDLER GEAR SHAFT BOLT**

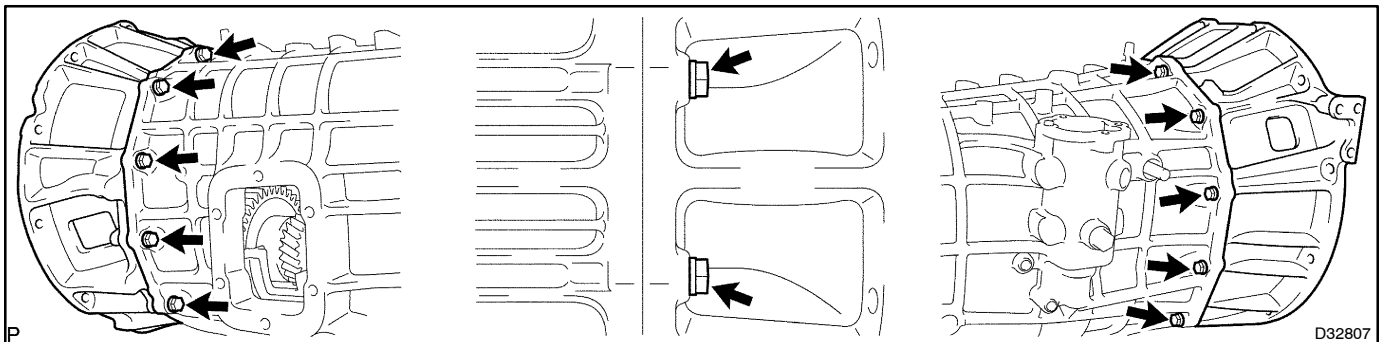


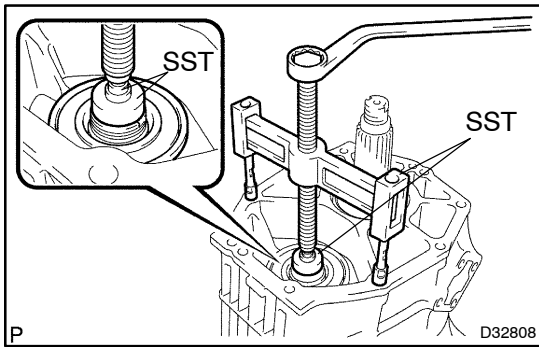
- 18. REMOVE SHIFT DETENT BALL**
 (a) Using a torx wrench (T40), remove the 2 plugs.



- (b) Using a magnet finger, remove the 2 springs and 2 shift detent balls.

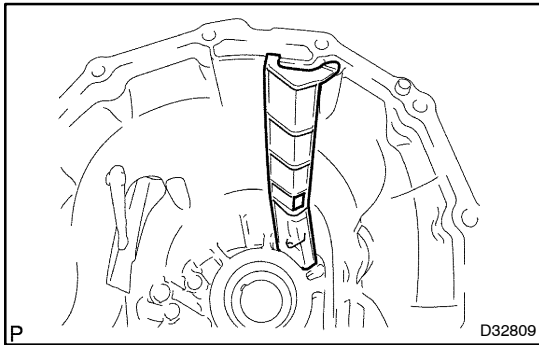
- 19. REMOVE TRANSMISSION CASE**
 (a) Remove the 12 bolts.



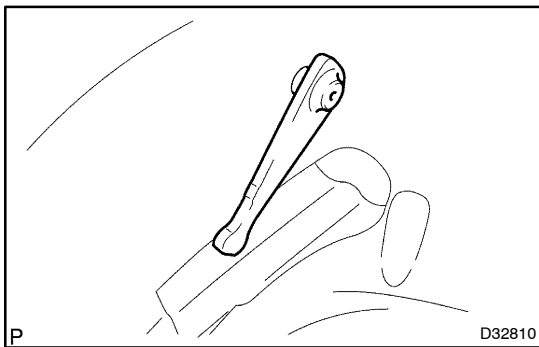


- (b) Using SST, remove the counter gear rear bearing, output shaft spacer and transmission case from the clutch housing.

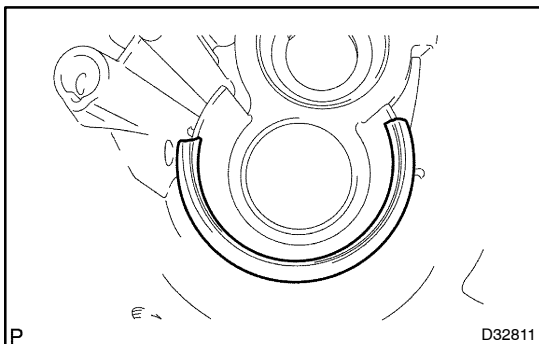
SST 09950-40011 (09951-04020, 09953-04030, 09957-04010), 09950-50013 (09952-05010, 09954-05021, 09955-05010), 09950-60010 (09951-00330)



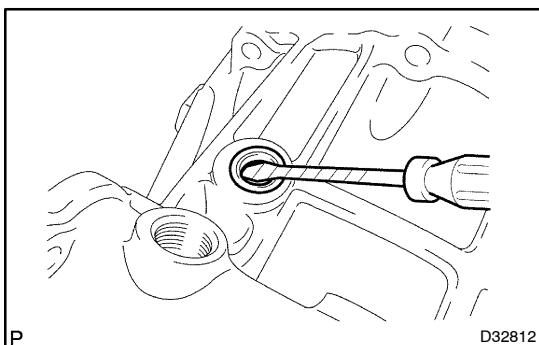
20. REMOVE TRANSMISSION OIL RECEIVER NO. 2



21. REMOVE SELECT LEVER SHAFT



22. REMOVE TRANSMISSION OIL SEPARATOR SEAL

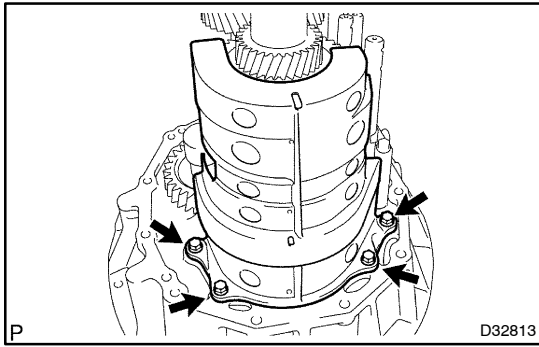


23. REMOVE SELECT LEVER OIL SEAL

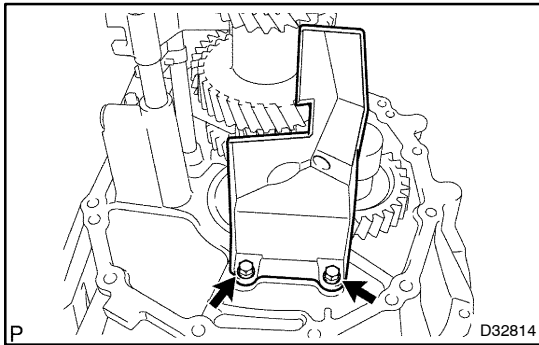
- (a) Using a screwdriver, pry out the oil seal from the transmission case.

HINT:

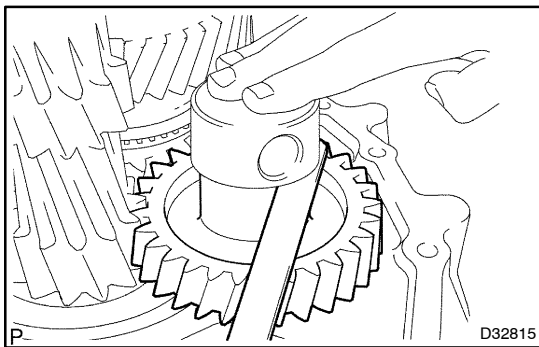
Tape the screwdriver tip before use.

**24. REMOVE TRANSMISSION OIL SEPARATOR**

- (a) Remove the 4 bolts and oil separate.

**25. REMOVE TRANSMISSION OIL RECEIVER NO. 1**

- (a) Remove the 2 bolts and oil receiver.

**26. INSPECT REVERSE IDLER GEAR THRUST CLEARANCE**

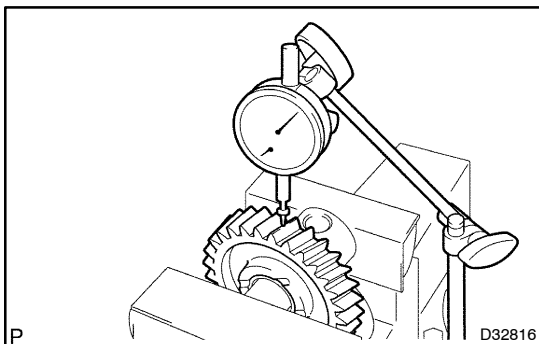
- (a) Using a feeler gauge, measure the thrust clearance.

Standard clearance:

0.10 to 0.62 mm (0.0039 to 0.0242 in.)

Maximum clearance:

0.62 mm (0.0242 in.)

**27. INSPECT REVERSE IDLER GEAR RADIAL CLEARANCE**

- (a) Using a dial indicator, measure the radial clearance.

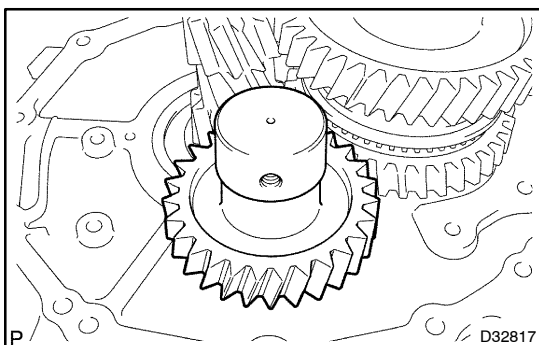
Standard clearance:

0.015 to 0.059 mm (0.0006 to 0.0023 in.)

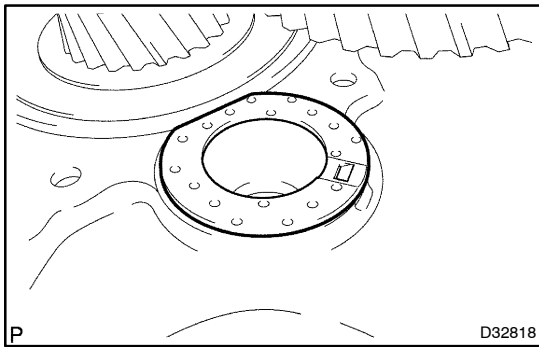
Maximum clearance:

0.059 mm (0.0023 in.)

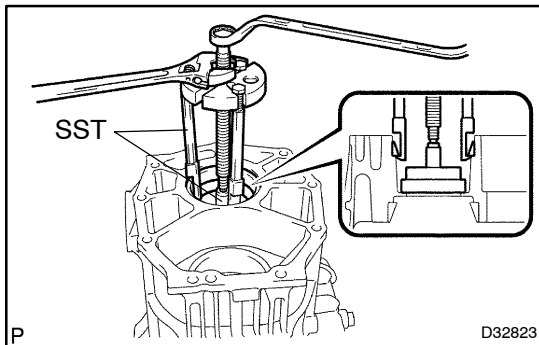
If the clearance is not as specified, replace the reverse idler gear needle roller bearing.

**28. REMOVE REVERSE IDLER GEAR**

- (a) Remove the gear shaft, needle roller bearing and gear.



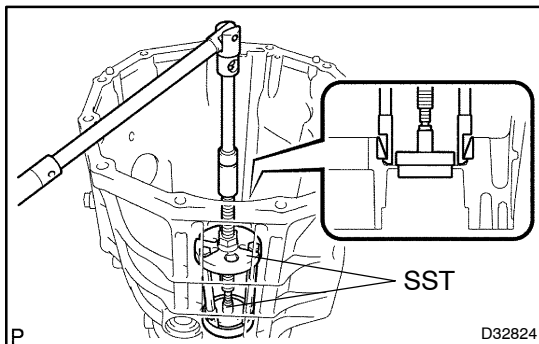
- (b) Remove the idler gear thrust washer.



29. REMOVE OUTPUT SHAFT REAR TAPERED ROLLER BEARING

- (a) Using SST, remove the roller bearing from the transmission case.

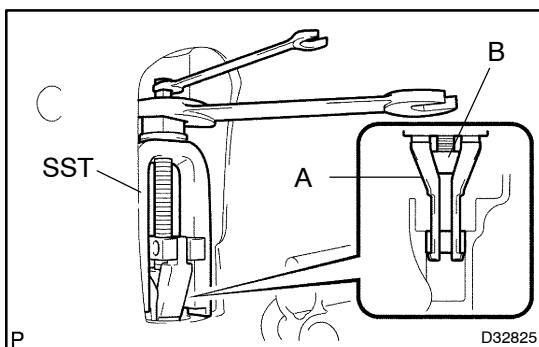
SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03021), 09950-40011 (09957-04010), 09950-60020 (09951-00750, 09952-06010), 09951-00700



30. REMOVE OUTPUT SHAFT FRONT TAPERED ROLLER BEARING

- (a) Using SST, remove the roller bearing from the transmission case.

SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03021), 09950-40011 (09957-04010), 09950-60010 (09951-00590, 09951-00610, 09952-06010)



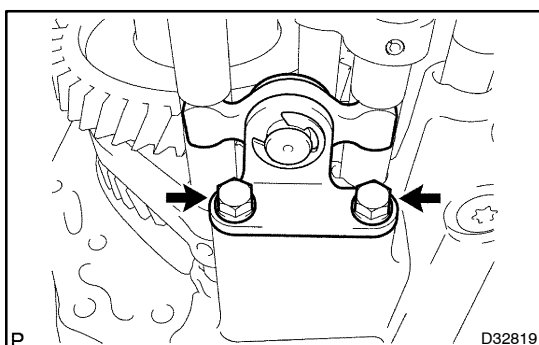
31. REMOVE SHIFT AND SELECT LEVER SHAFT BIMETAL FORMED BUSH

- (a) Using SST, remove the bush from the transmission case.

SST 09319-60020

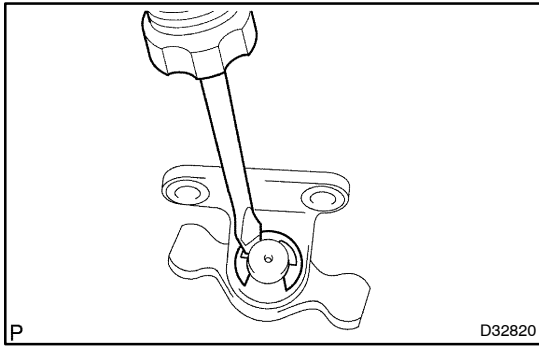
NOTICE:

- Do not damage it.
- When setting SST A into the bush, do not tighten SST B using a tool. Tighten it lightly with your hand.

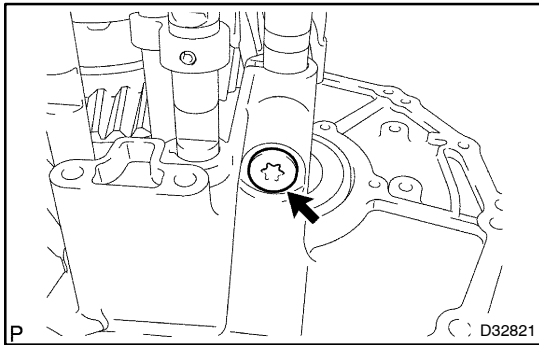


32. REMOVE SHIFT LEVER INNER

- (a) Remove the 2 bolts and shift lever from the clutch housing.

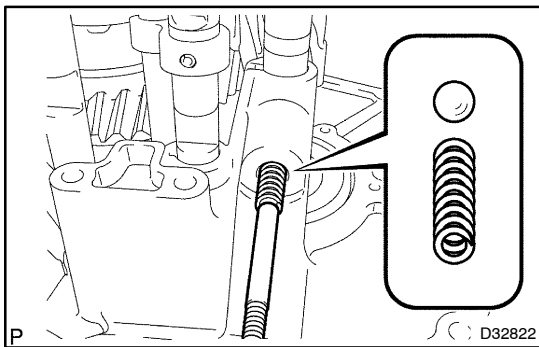


- (b) Using a screwdriver, remove the E-ring, shift lever and pin from the shift lever inner mount.

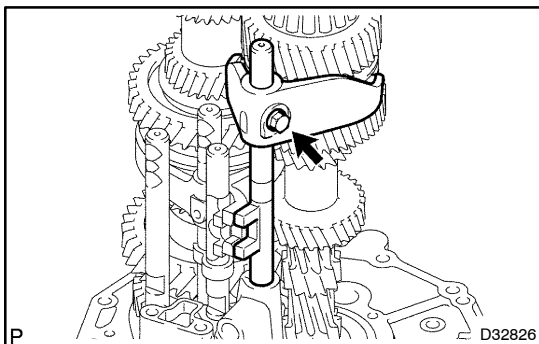


33. REMOVE SHAFT DETENT BALL

- (a) Using a torx socket wrench (T40), remove the shift detent ball plug from the clutch housing.

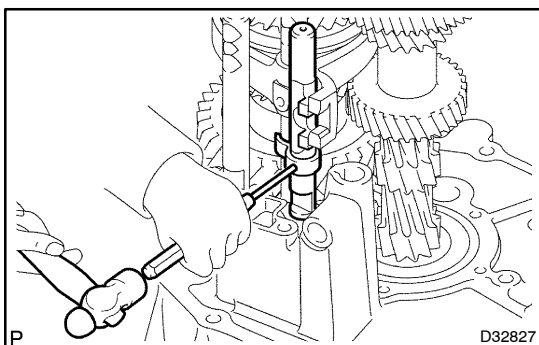


- (b) Using a magnetic finger, remove the spring and ball from the clutch housing.



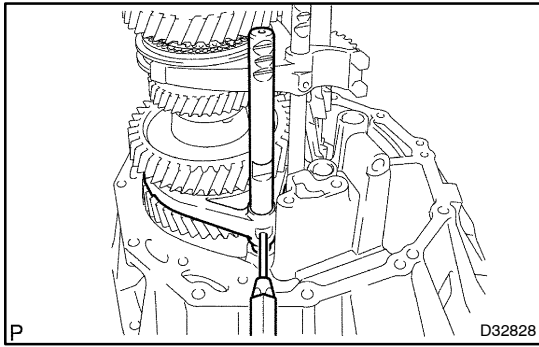
34. REMOVE SHIFT FORK SHAFT NO. 3

- (a) Remove the bolt, shift fork shaft and gear shift fork.

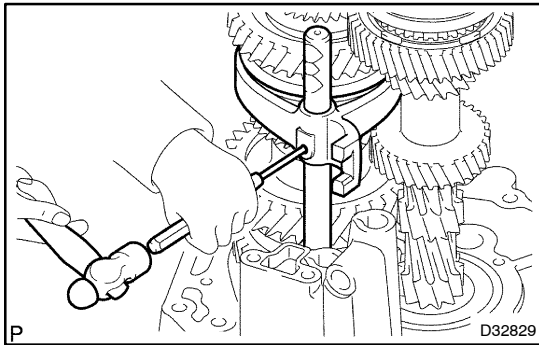


35. REMOVE SHIFT FORK SHAFT NO. 4

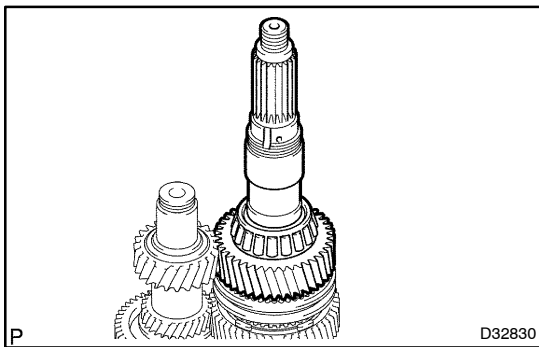
- (a) Using a pin punch (5 mm (0.20 in.)) and hammer, tap out the shift fork slotted pin, shift fork shaft and gear shift fork guide.

**36. REMOVE SHIFT FORK SHAFT NO. 1**

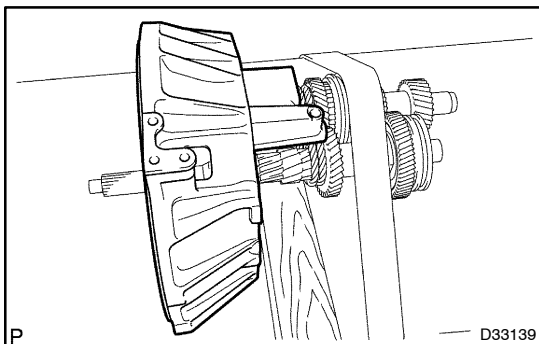
- (a) Using a pin punch (5 mm (0.20 in.)) and hammer, tap out the slotted pin, shift fork shaft and gear shift fork.

**37. REMOVE SHIFT FORK SHAFT NO. 2**

- (a) Using a pin punch (5 mm (0.20 in.)) and hammer, tap out the slotted pin, shift fork shaft and gear shift fork.

**38. REMOVE OUTPUT SHAFT**

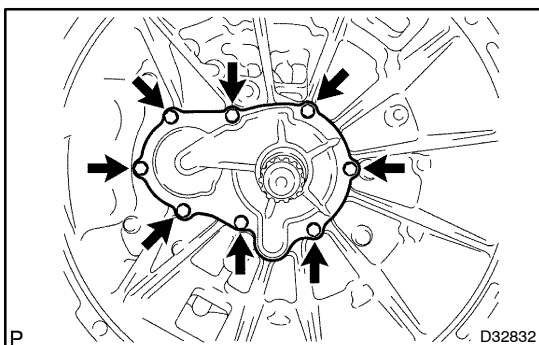
- (a) Remove the output shaft and synchronizer ring No.4.

**39. FIX CLUTCH HOUSING ASSY**

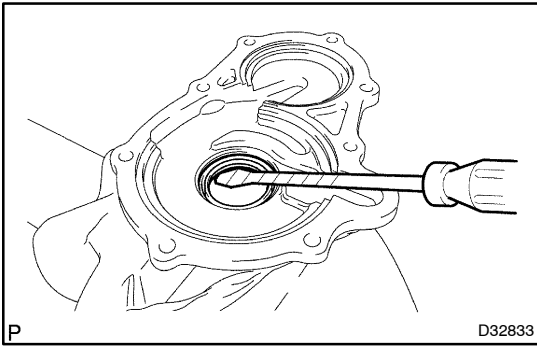
- (a) Bind the input shaft and counter gear together with a rope or wire.
 (b) Place them on a wooden block and fix them to the work bench with a belt.

NOTICE:

Be careful not to drop the clutch housing assy.

**40. REMOVE TRANSMISSION FRONT BEARING RETAINER**

- (a) Remove the 8 bolts and retainer.

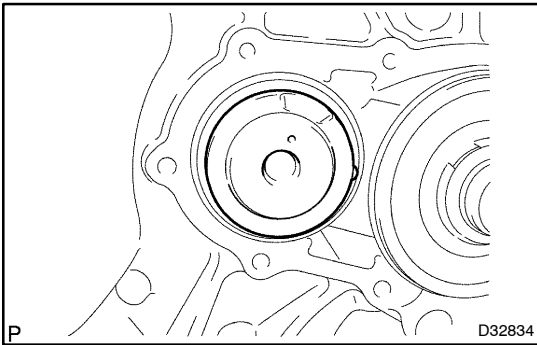


41. REMOVE TRANSMISSION FRONT BEARING RETAINER OIL SEAL

- (a) Using a screwdriver, pry out the oil seal from the retainer.

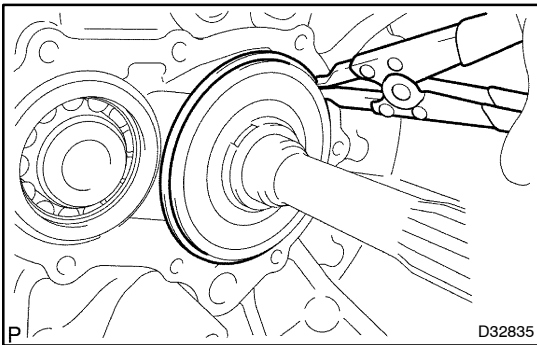
HINT:

Tape the screwdriver tip before use.



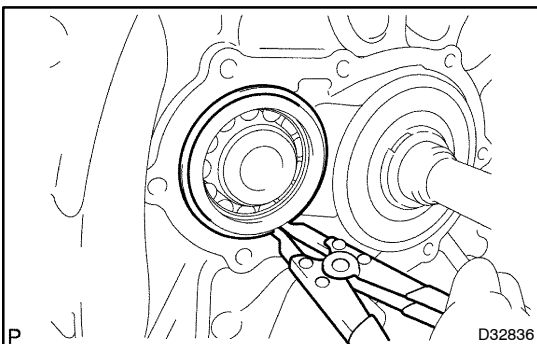
42. REMOVE TRANSMISSION FRONT BEARING RETAINER OIL RECEIVER

- (a) Remove the oil receiver from the clutch housing.



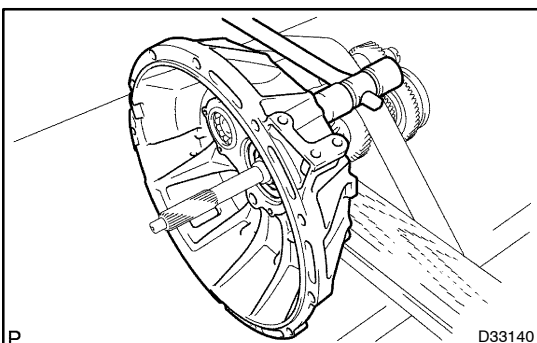
43. REMOVE INPUT SHAFT FRONT BEARING SNAP RING

- (a) Using a snap ring expander, remove the snap ring from the input shaft front bearing.



44. REMOVE COUNTER GEAR FRONT BEARING SNAP RING

- (a) Using a snap ring expander, remove the snap ring from the counter gear front bearing.



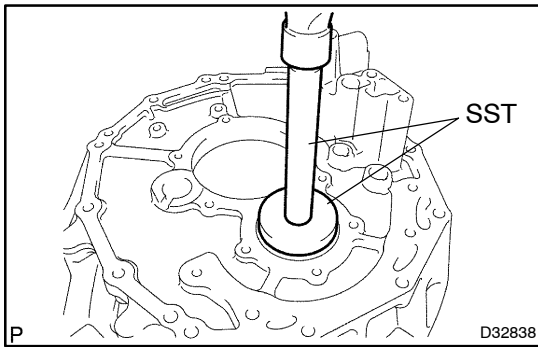
45. REMOVE CLUTCH HOUSING ASSY

- (a) Using a plastic hammer, tap out the clutch housing.

NOTICE:

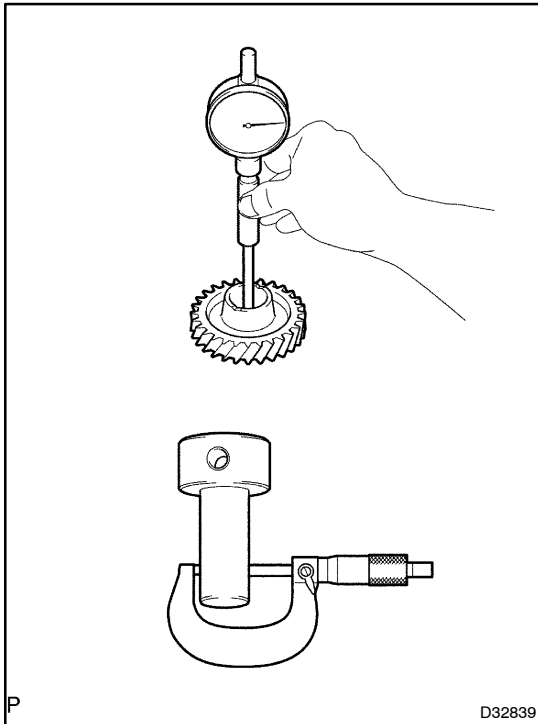
Do not allow the clutch housing assy to fall.

- (b) Remove the rope or wire from the input shaft and counter gear.

**46. REMOVE COUNTER GEAR FRONT BEARING**

- (a) Using SST and a hammer, remove the bearing from the clutch housing.

SST 09950-60020 (09951-00680), 09950-70010 (09951-07100)

**47. REMOVE REVERSE IDLER GEAR**

- (a) Using a cylinder gauge, measure the inside diameter of the gear.

Standard inside diameter:

35.015 to 35.036 mm (1.3785 to 1.3793 in.)

Maximum inside diameter: 35.036 mm (1.3793 in.)

If the inside diameter exceeds the maximum, replace the reverse idler gear.

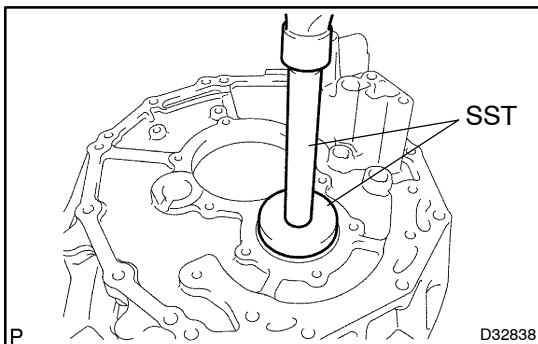
- (b) Using a micrometer, measure the outer diameter of the idler gear shaft.

Standard outer diameter:

27.987 to 28.000 mm (1.1018 to 1.1024 in.)

Minimum outer diameter: 27.987 mm (1.1018 in.)

If the diameter is less than the minimum, replace the reverse idler gear shaft.

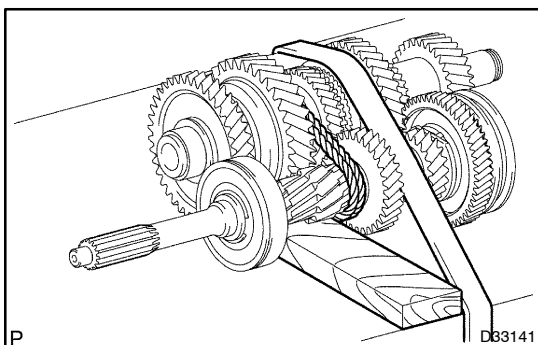
**48. INSTALL COUNTER GEAR FRONT BEARING**

- (a) Using SST and a hammer, tap in a new bearing to the clutch housing.

SST 09950-60020 (09951-00680), 09950-70010 (09951-07100)

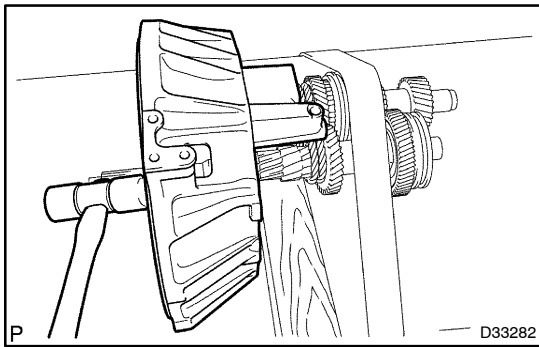
NOTICE:

When installing, face the snap ring grooves to the engine side.

**49. INSTALL CLUTCH HOUSING ASSY**

- (a) Bind the input shaft and counter gear together with a rope or wire.

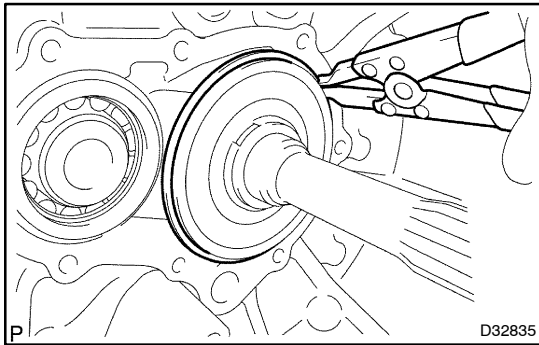
- (b) Place them on a wooden block and fix them to the work bench with a belt.



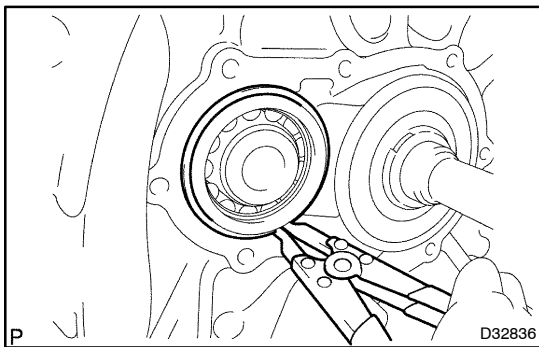
- (c) Using a plastic hammer, tap in the input shaft and counter gear.

NOTICE:

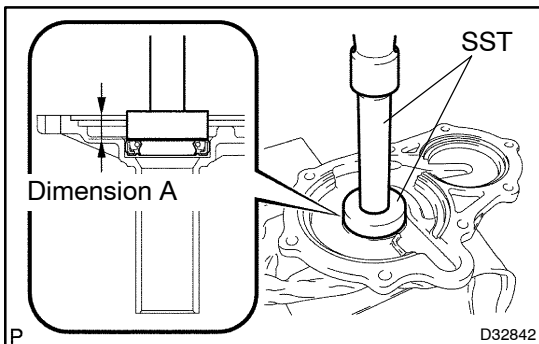
- Do not allow the clutch housing to fall.
- Be careful not to damage or drop the counter gear front bearing.

**50. INSTALL INPUT SHAFT FRONT BEARING SNAP RING**

- (a) Using a snap ring expander, install a new snap ring to the input shaft front bearing.

**51. INSTALL COUNTER GEAR FRONT BEARING SNAP RING**

- (a) Using a snap ring expander, install a new snap ring to the counter gear front bearing.

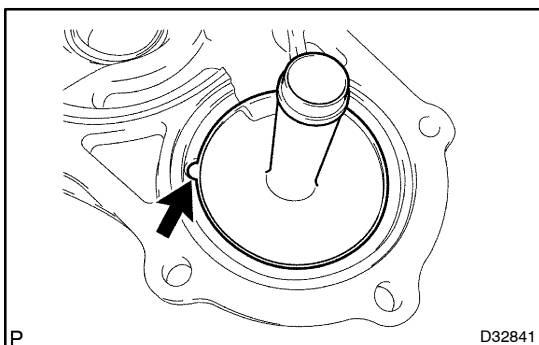
**52. INSTALL TRANSMISSION FRONT BEARING RETAINER OIL SEAL**

- (a) Using SST and a hammer, tap in a new oil seal to the retainer according to dimension A.

SST 09950-60010 (09951-00480), 09950-70010 (09951-07100)

Dimension A: 13.8 to 14.6 mm (0.543 to 0.575 in.)

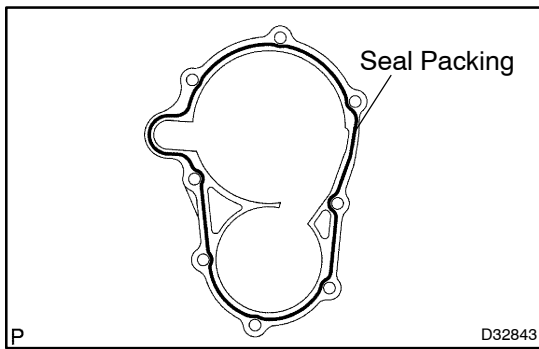
- (b) Coat the rip of the oil seal with MP grease.

**53. INSTALL TRANSMISSION FRONT BEARING RETAINER OIL RECEIVER**

- (a) Install the oil receiver to the transmission front bearing retainer.

HINT:

When installing, align the turn stopper on the oil receiver with the grooves on the bearing retainer.

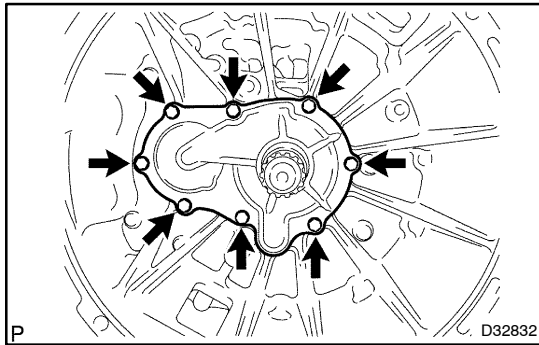


54. INSTALL TRANSMISSION FRONT BEARING RETAINER

- (a) Apply FIPG (seal packing) to the retainer as shown in the illustration.

FIPG:

Part No. 08826-00090, THREE BOND 1281 or equivalent



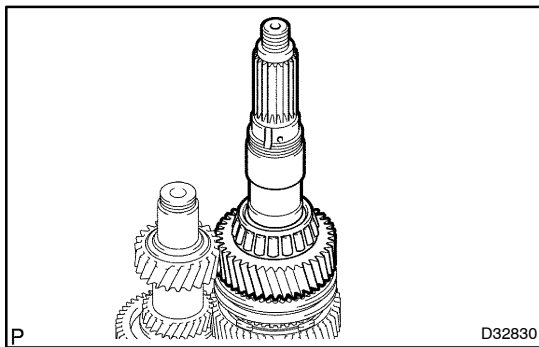
- (b) Coat 8 new bolts with sealant.

Adhesive:

Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

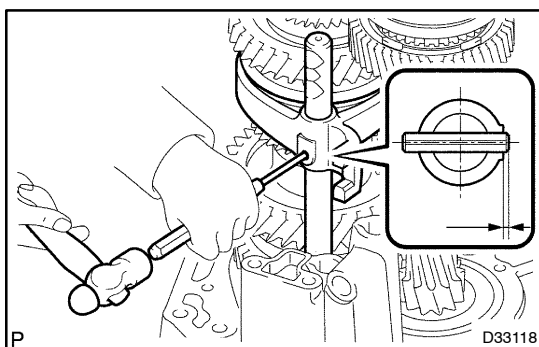
Torque: 17 N·m (173 kgf·cm, 13 ft·lbf)

- (c) Install the transmission front bearing retainer with the 8 sealant-coated bolts.
 (d) Remove the rope from the input shaft and counter gear.



55. INSTALL OUTPUT SHAFT

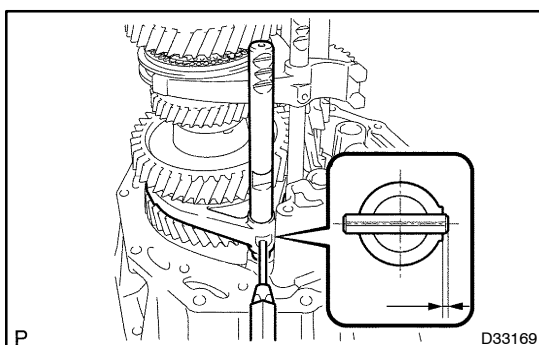
- (a) Coat the output shaft and synchronizer ring with gear oil, and install them.



56. INSTALL SHIFT FORK SHAFT NO. 2

- (a) Coat the sliding and rotating surface of the gear shift fork and shift fork shaft with gear oil, and install them.
 (b) Using a pin punch (5 mm (0.20 in.)) and hammer, tap in the shaft fork slotted pin to the gear shift fork and shift fork shaft.

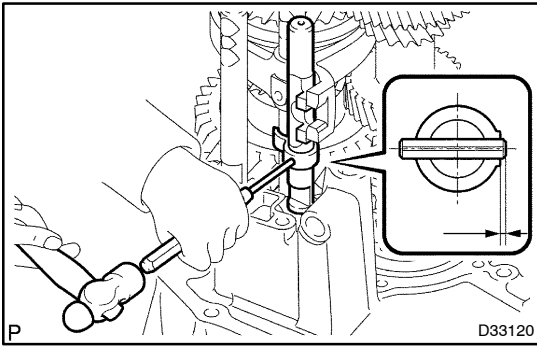
Drive in depth: 0 to 1.0 mm (0 to 0.039 in.)



57. INSTALL SHIFT FORK SHAFT NO. 1

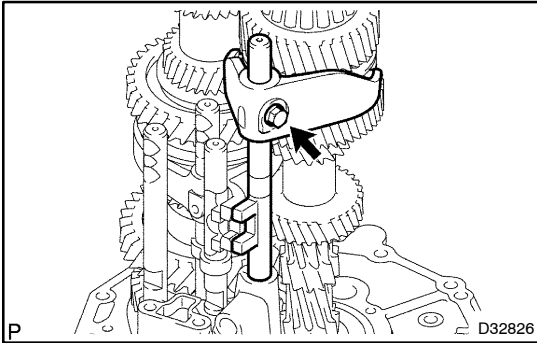
- (a) Coat the sliding and rotating gear shift fork and shift fork shaft with gear oil, and install them.
 (b) Using a pin punch (5 mm (0.20 in.)) and hammer, tap in the shift fork slotted pin to the gear shift fork and shift fork shaft.

Drive in depth: 0 to 1.0 mm (0 to 0.039 in.)

**58. INSTALL SHIFT FORK SHAFT NO. 4**

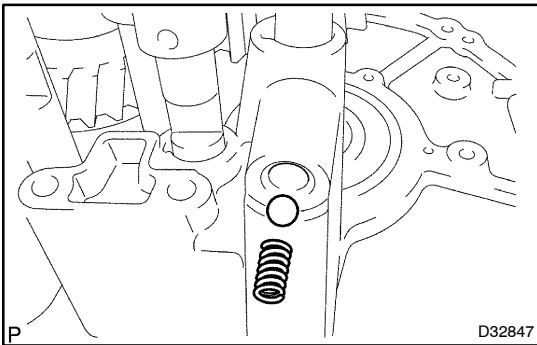
- (a) Coat the sliding and rotating surface of the gear shift fork and shift fork shaft with gear oil, and install them.
- (b) Using a pin punch (5 mm (0.20 in.)) and hammer, tap in the shift fork slotted pin to the gear shift fork guide and shift fork shaft.

Drive in depth: 0 to 1.0 mm (0 to 0.039 in.)

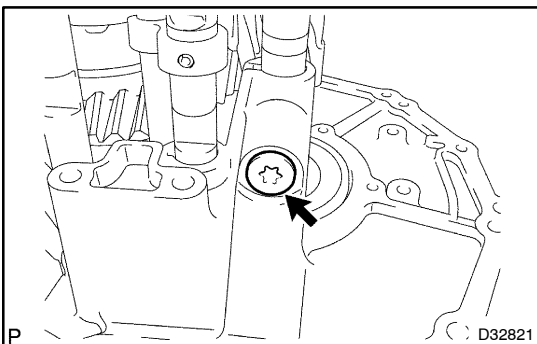
**59. INSTALL SHIFT FORK SHAFT NO. 3**

- (a) Coat the sliding and rotating surface of the gear shift fork and shift fork shaft with gear oil, and install them.
- (b) Install a new shift fork lock bolt to the gear shift fork and gear shift fork shaft.

Torque: 46 N·m (469 kgf·cm, 34 ft·lbf)

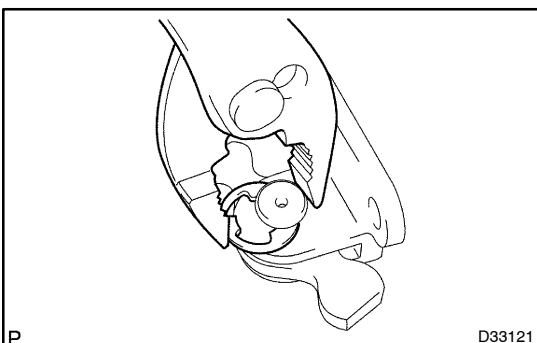
**60. INSTALL SHAFT DETENT BALL**

- (a) Install the ball and spring to the hole of the clutch housing.

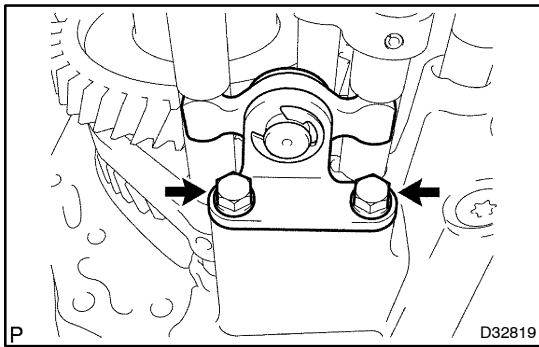


- (b) Using a torx wrench (T40), install a new plug to the clutch housing.

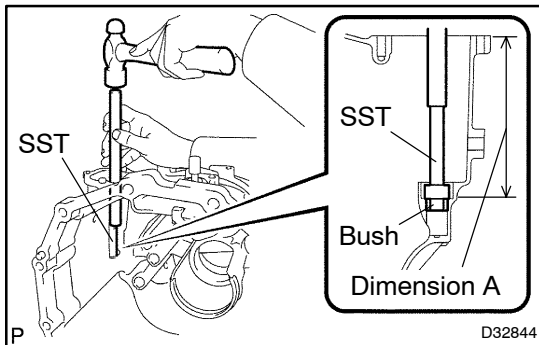
Torque: 19 N·m (194 kgf·cm, 14 ft·lbf)

**61. INSTALL SHIFT LEVER INNER**

- (a) Install the shift lever and pin to the mount.
- (b) Using pliers, install a new E-ring to the shift lever.

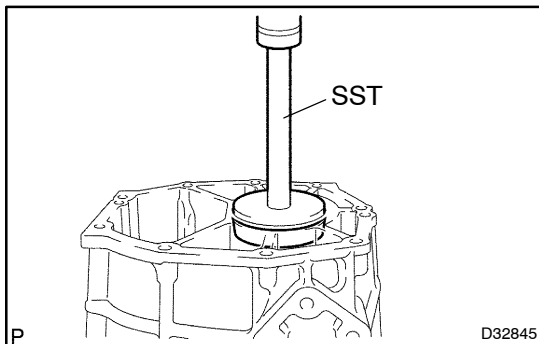


- (c) Install the shift lever to the clutch housing with the 2 bolts.
Torque: 23 N·m (235 kgf·cm, 17 ft·lbf)



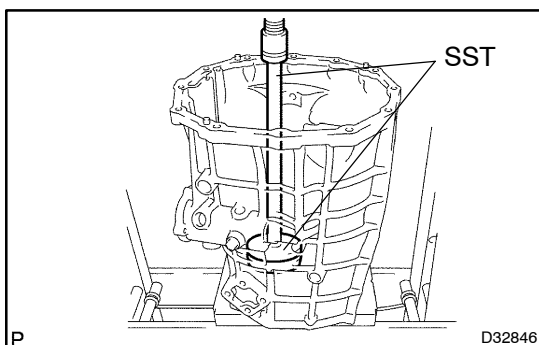
62. INSTALL SHIFT AND SELECT LEVER SHAFT BIMETAL FORMED BUSH

- (a) Using SST, a brass bar and hammer, tap in a new bush to the transmission case according to dimension A.
SST 09820-36010
Dimension A: 149.0 to 150.0 mm (5.866 to 5.906 in.)



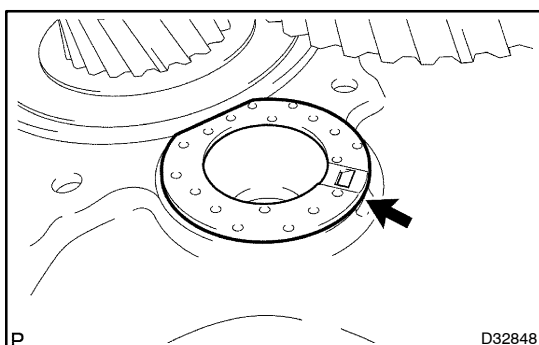
63. INSTALL OUTPUT SHAFT REAR TAPERED ROLLER BEARING

- (a) Using SST and a press, press in a new bearing to the transmission case.
SST 09950-70010 (09951-07100), 09951-01000



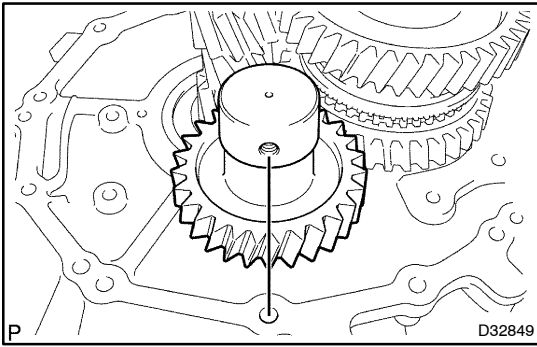
64. INSTALL OUTPUT SHAFT FRONT TAPERED ROLLER BEARING (OUTER RACE)

- (a) Using SST and a press, press in a new bearing to the transmission case.
SST 09950-60020 (09951-00890), 09950-70010 (09951-07360)



65. INSTALL REVERSE IDLER GEAR

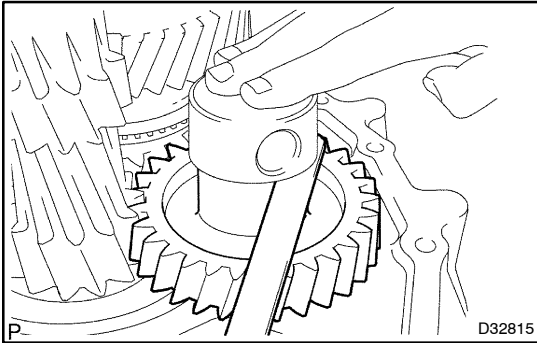
- (a) Aligning the turn stopper (protruding part) on the reverse idler gear thrust washer with the hole on the clutch housing.



- (b) Coat the sliding and rotating surface of the reverse idler gear shaft, reverse idler gear needle roller bearing and reverse idler gear with gear oil, and install them.

NOTICE:

Align the mark on the reverse idler gear shaft and bolt hole as shown in the illustration.

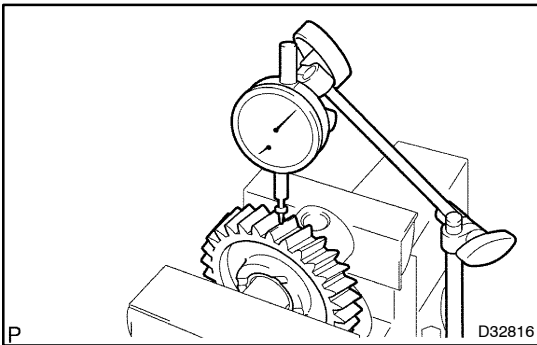
**66. INSPECT REVERSE IDLER GEAR THRUST CLEARANCE**

- (a) Using a feeler gauge, measure the thrust clearance of the reverse idler gear.

Standard clearance:

0.10 to 0.62 mm (0.0039 to 0.0244 in.)

Maximum clearance: 0.62 mm (0.0244 in.)

**67. INSPECT REVERSE IDLER GEAR RADIAL CLEARANCE**

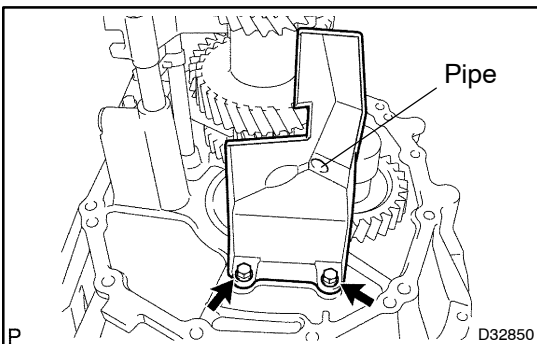
- (a) Using a dial indicator, measure the radial clearance of the reverse idler gear.

Standard clearance:

0.015 to 0.059 mm (0.0006 to 0.0023 in.)

Maximum clearance: 0.059 mm (0.0023 in.)

If the clearance exceeds the maximum, replace the reverse idler gear needle roller bearing.

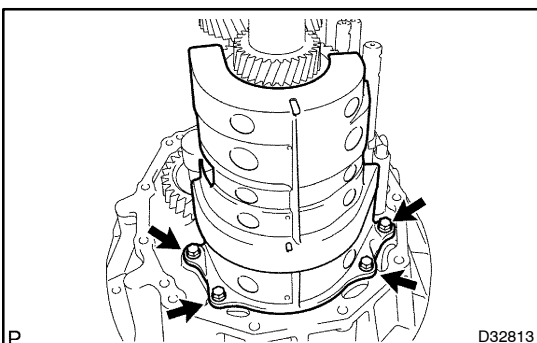
**68. INSTALL TRANSMISSION OIL RECEIVER NO. 1**

- (a) Install the oil receiver with the 2 bolts.

Torque: 23 N·m (235 kgf·cm, 17 ft·lbf)

HINT:

Install the pipe of the oil receiver to the hole of the reverse idler gear shaft.

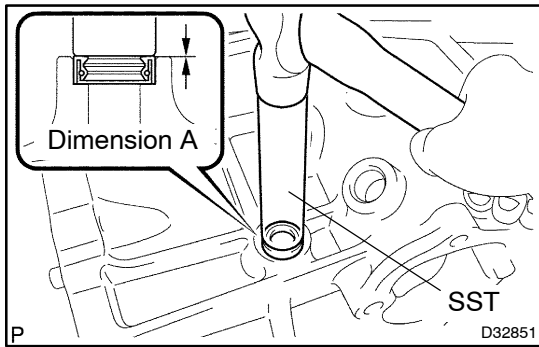
**69. INSTALL TRANSMISSION OIL SEPARATOR**

- (a) Install the oil separator with the 4 bolts.

Torque: 23 N·m (235 kgf·cm, 17 ft·lbf)

HINT:

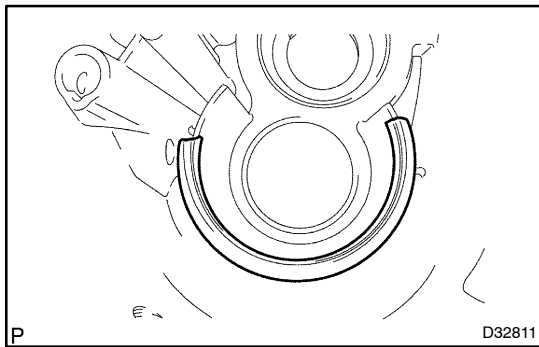
While installing the oil separator, slightly lift up the counter gear.

**70. INSTALL SELECT LEVER OIL SEAL**

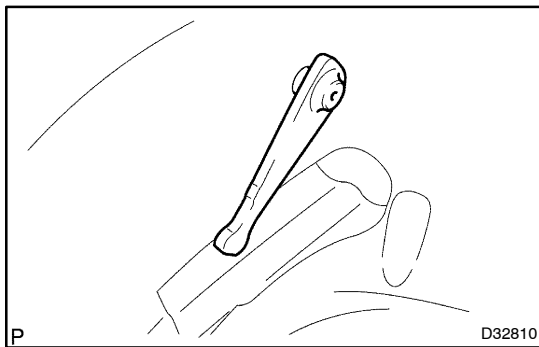
- (a) Using SST and a hammer, tap in a new select lever shaft oil seal to the transmission according to dimension A.
SST 09950-60010 (09951-00200), 09950-70010 (09951-07100)

Dimension A: 0 to 1.0 mm (0 to 0.039 in.)

- (b) Apply MP grease to the lip of the oil seal.

**71. INSTALL TRANSMISSION OIL SEPARATOR SEAL**

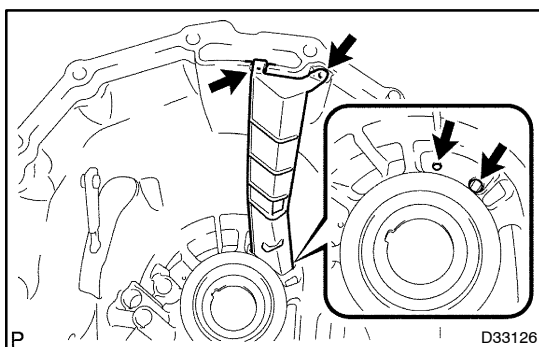
- (a) Install a new seal to the transmission case.

**72. INSTALL SELECT LEVER SHAFT**

- (a) Install the shaft to the transmission case.

NOTICE:

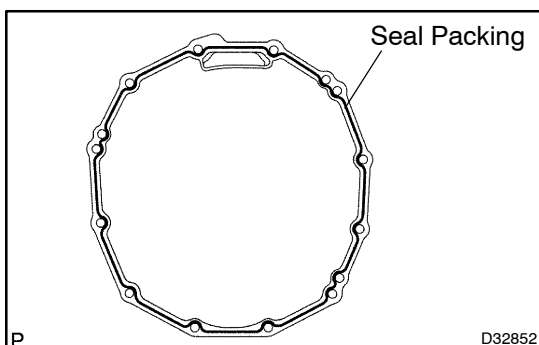
Make sure to set the select lever at the position shown in the illustration, otherwise you may have trouble at a later work.

**73. INSTALL TRANSMISSION OIL RECEIVER NO. 2**

- (a) Install the oil receiver to the transmission case.

HINT:

Insert the protruding part on the oil receiver No. 2 into the groove on the transmission case.

**74. INSTALL TRANSMISSION CASE**

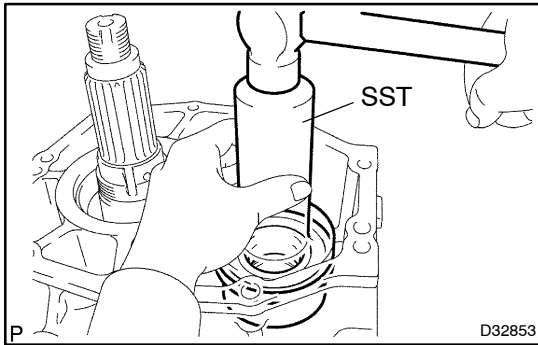
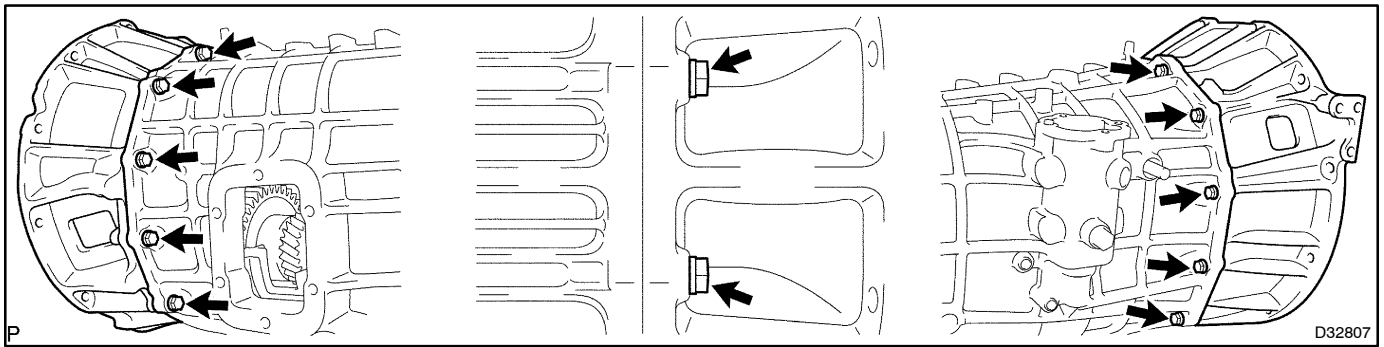
- (a) Apply FIPG (seal packing) to the transmission case as shown in the illustration.

FIPG:

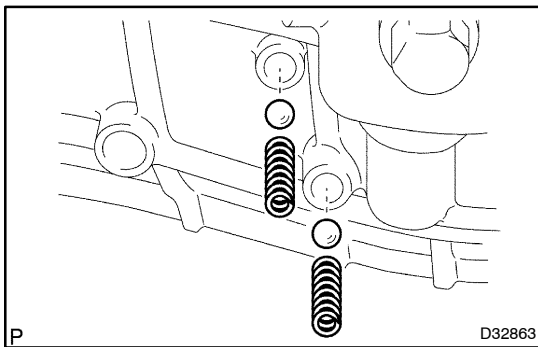
Part No. 08826-00090, THREE BOND 1281 or equivalent

- (b) Install the transmission case to the clutch housing with 12 new bolts.

Torque: 37 N·m (377 kgf·cm, 27 ft·lbf)

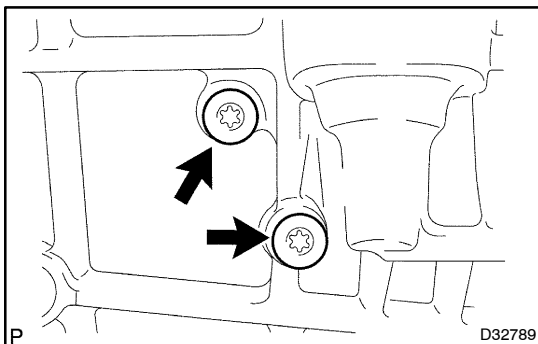


- (c) Using SST and a hammer, tap in a new counter gear rear bearing to the counter gear.
SST 09309-36010
- (d) Install a new spacer and new output shaft rear tapered roller bearing to the output shaft.
- (e) Temporarily install a new output shaft adjusting nut to the output shaft.
- (f) Temporarily install a new counter gear lock nut to the counter gear.



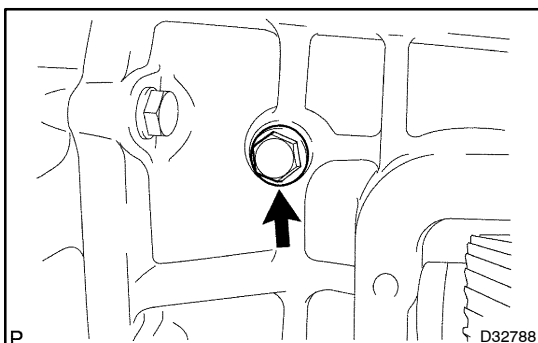
75. INSTALL SHIFT DETENT BALL

- (a) Install the 2 balls and 2 springs into the transmission case.



- (b) Using a torx wrench (T40), install 2 new plugs to the transmission case.

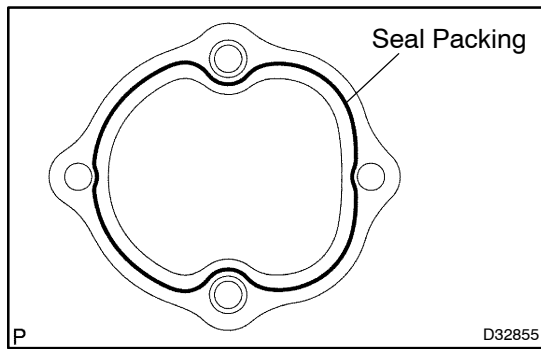
Torque: 19 N·m (194 kgf-cm, 14 ft-lbf)



76. INSTALL REVERSE IDLER GEAR SHAFT BOLT

- (a) Install a new bolt to the transmission case.

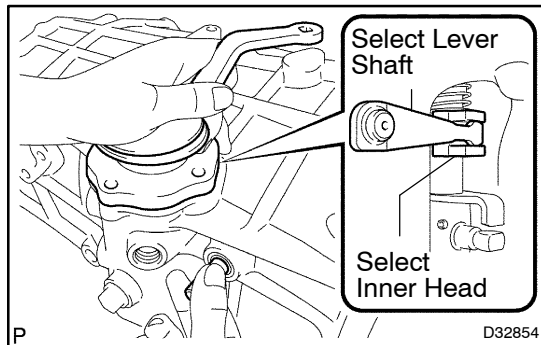
Torque: 28 N·m (286 kgf-cm, 21 ft-lbf)

**77. INSTALL SHIFT LEVER SHAFT HOUSING ASSY**

- (a) Apply FIPG (seal packing) to the housing as shown in the illustration.

FIPG:

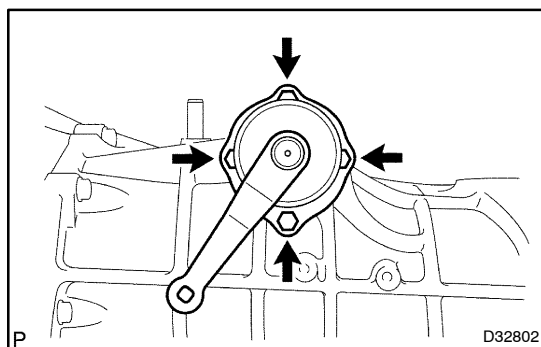
Part No. 08826-00090, THREE BOND 1281 or equivalent



- (b) Install the select return spring to the transmission case.
 (c) Insert the tip of the select lever shaft into the hole on the select inner head.

NOTICE:

Be careful not to let the select lever fall into the transmission case.

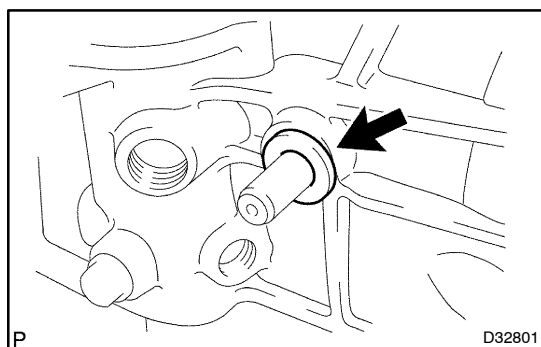


- (d) Install the housing to the transmission case with the 4 bolts.

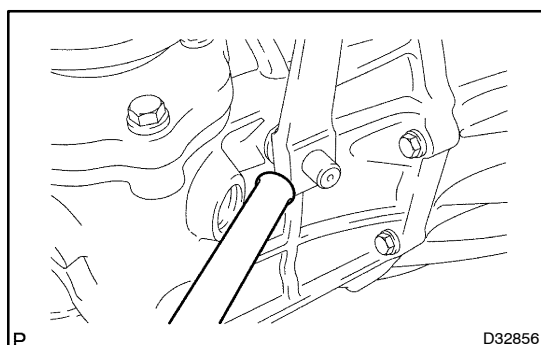
Torque: 17 N·m (173 kgf·cm, 13 ft·lbf)

NOTICE:

Be sure that the shift inner lever is inserted into the grooves on the shift fork shaft No. 4 and shift fork No. 2.

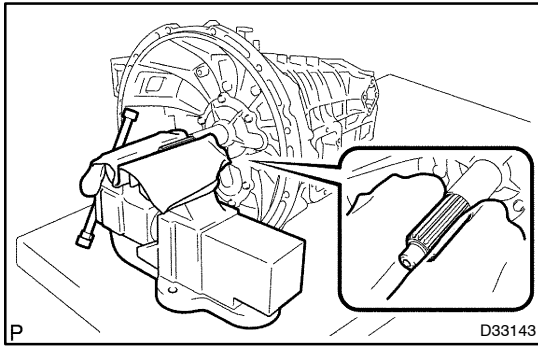
**78. INSTALL OUTER SELECT LEVER**

- (a) Install the washer to the select lever shaft.
 (b) Install the lever to the select lever shaft.



- (c) Using a brass bar and hammer, tap in a new select lever shaft knock pin to the outer select lever.
 (d) Secure the knock pin with a new spring washer and the nut.

Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

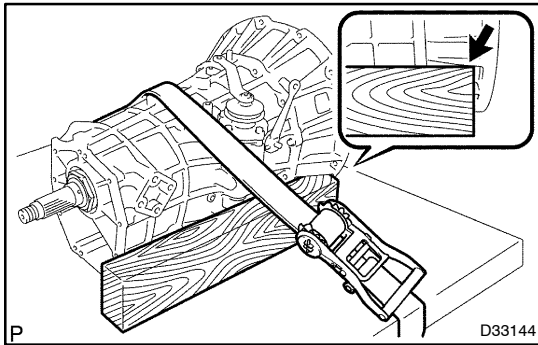


79. ADJUST OUTPUT SHAFT TAPERD ROLLER BEARING PRELOAD

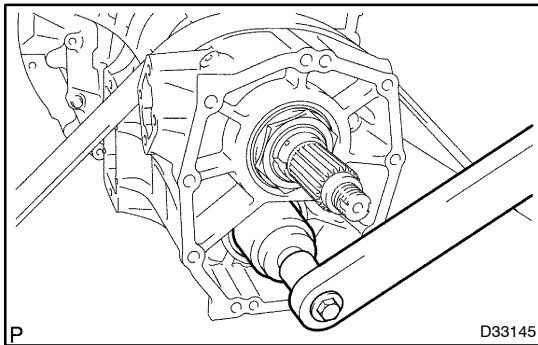
- (a) Fix the input shaft's spline part through 2 protective aluminum plates and a shop rag in a vise, and move the gear to the 4th place.

NOTICE:

Be careful not to damage the spline area.

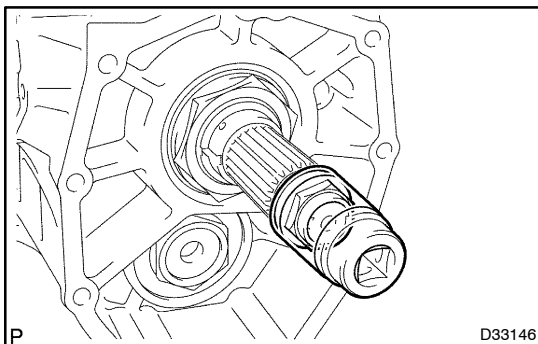


- (b) Using 2 belts and a wooden block, fasten the transmission to the work bench.



- (c) Using a 50 mm socket wrench, install the counter gear lock nut.

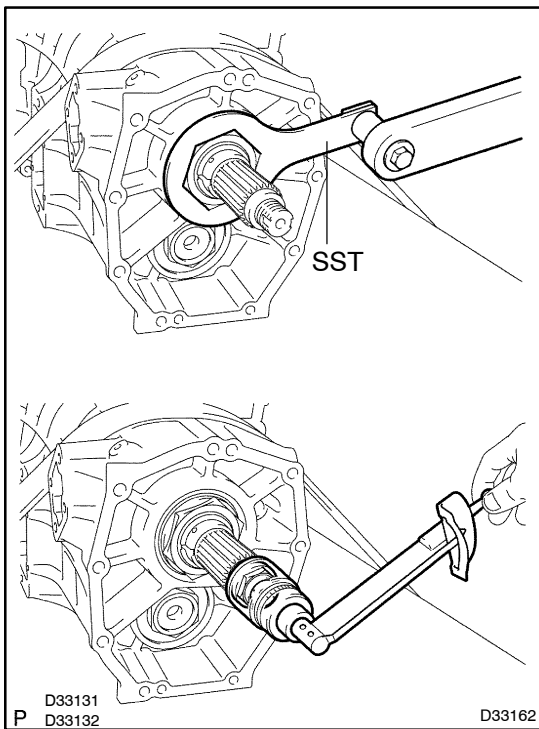
Torque: 132 N·m (1,346 kgf·cm, 97 ft·lbf)



- (d) Install the output shaft rear set nut.

HINT:

- The output shaft rear set nut is used for measuring preload.
- The output shaft rear set nut's code is 90179-24008.



- (e) Using SST, tighten the output shaft adjusting nut so that the preload is within the standard.

SST 09617-28010

Preload (at starting):

0.3 to 0.8 N·m (3.06 to 8.16 kgf·cm 2.66 to 7.10 in·lbf)

HINT:

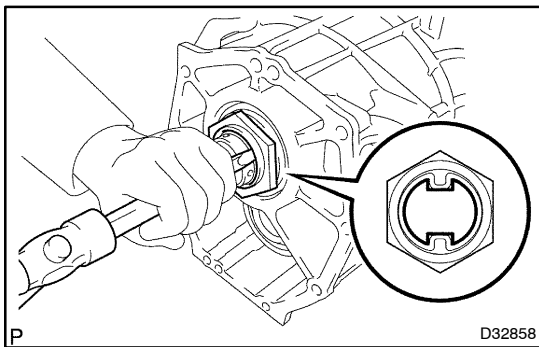
Before preload measurement, return the gear to neutral.

If the result is not as specified, tighten and adjust the output shaft adjusting nut.

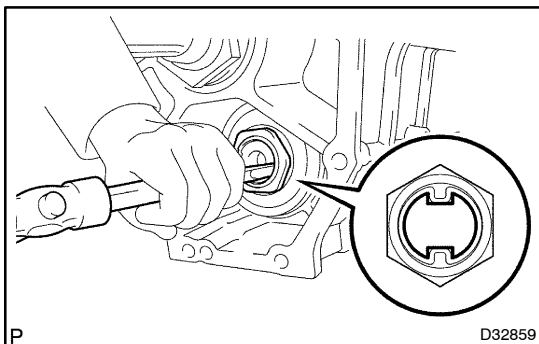
NOTICE:

If the output shaft adjusting nut is loosened or removed due to large preload, always replace the output shaft tapered roller bearing spacer with a new spacer.

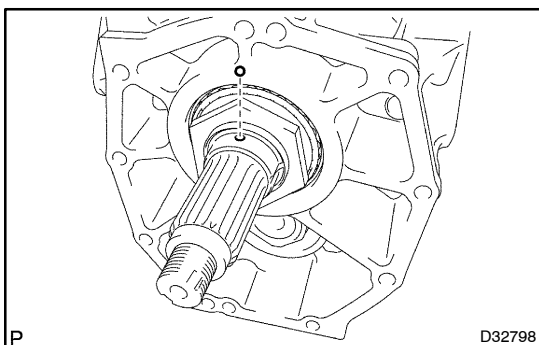
- (f) Remove the output shaft rear set nut.
 (g) Remove the 2 belts and wooden block from the transmission assy.
 (h) Remove the gear to neutral and remove the input shaft from the vise.



- (i) Using a chisel and hammer, caulk the output shaft adjusting nut.

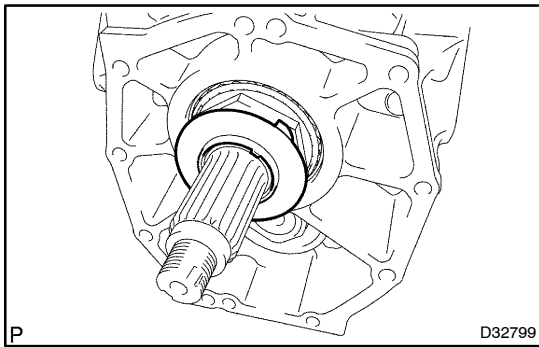


- (j) Using a chisel and hammer, caulk the counter gear lock nut.

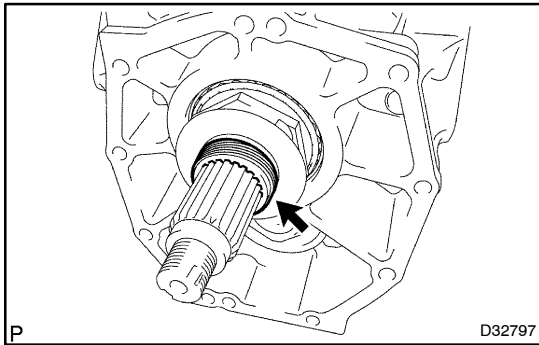


80. INSTALL SPEEDOMETER DRIVE GEAR PIN (BALL)

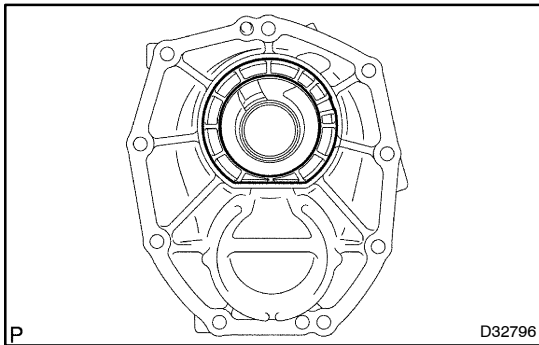
- (a) Apply MP grease to the pin (ball).
 (b) Install the pin (ball) to the output shaft.



81. INSTALL TRANSMISSION OIL RECEIVER NO. 3



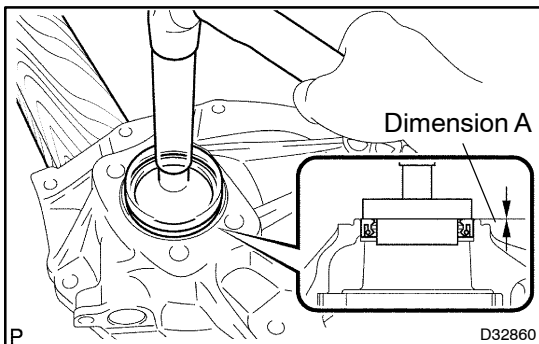
82. INSTALL SPEEDOMETER DRIVE GEAR



83. INSTALL TRANSMISSION REAR BEARING RETAINER SPEACER

NOTICE:

Be careful with the installation direction.



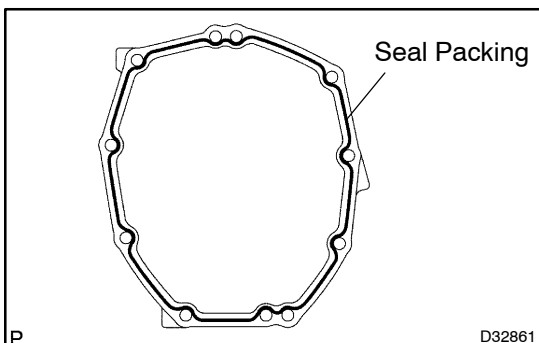
84. INSTALL TRANSMISSION REAR BEARING RETAINER OIL SEAL

- Place the transmission rear retainer on a wooden block.
- Using SST and a hammer, tap in a new oil seal to the transmission case according to the dimension A.

SST 09950-60010 (09951-00470, 09951-00610, 09952-06010), 09950-70010 (09951-07100)

Dimension A: 0 to 0.5 mm (0 to 0.0120 in.)

- Apply a light coat of grease to the lip of the transmission rear retainer oil seal.

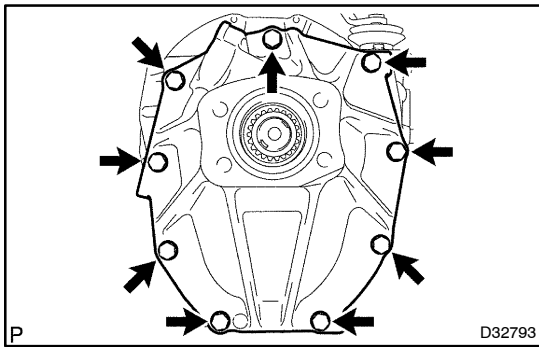


85. INSTALL TRANSMISSION REAR BEARING RETAINER

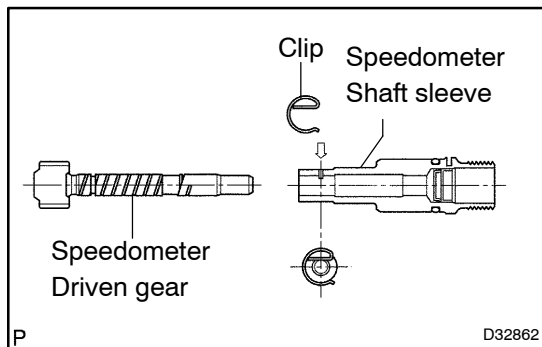
- Apply FIPG (seal packing) to the retainer as shown in the illustration.

FIPG:

Part No. 08826-00090, THREE BOND 1281 or equivalent.



- (b) Install the retainer with the 9 bolts.
Torque: 37 N·m (377 kgf·cm, 27 ft·lbf)



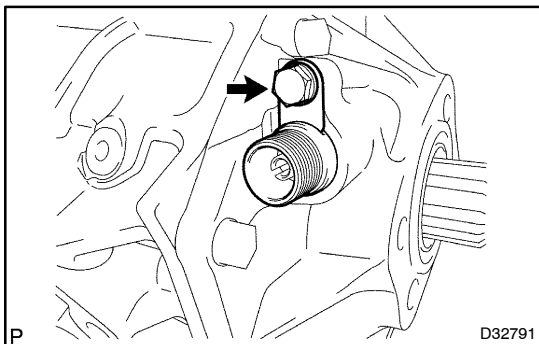
86. INSTALL SPEEDOMETER DRIVEN GEAR SUB-ASSY

- (a) Install a new O-ring to the speedometer sleeve.
 (b) Install the driven gear to the speedometer sleeve with the clip.

NOTICE:

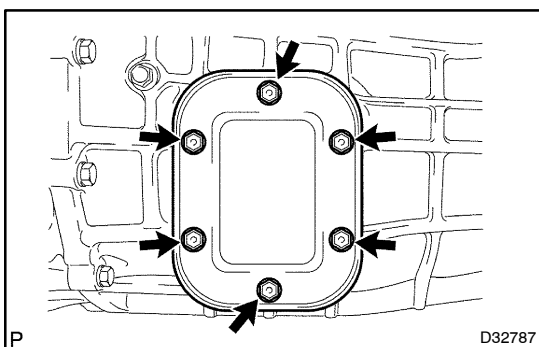
Make sure to install the clip in the direction shown in the illustration.

- (c) Install the driven gear to the transmission rear bearing retainer.



- (d) Install the speedometer sleeve lock plate to the transmission rear retainer with the bolt.

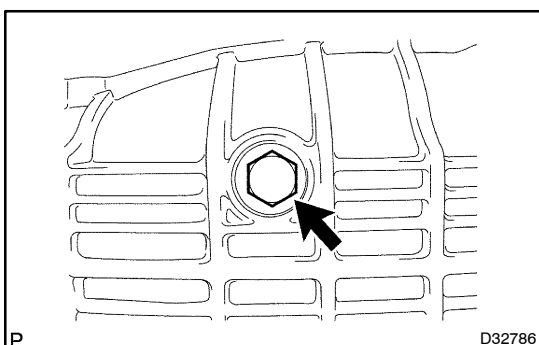
Torque: 11 N·m (112 kgf·cm, 8 ft·lbf)



87. INSTALL MANUAL TRANSMISSION POWER TAKE-OFF COVER

- (a) Install a new gasket and the power take-off cover with the 6 bolts.

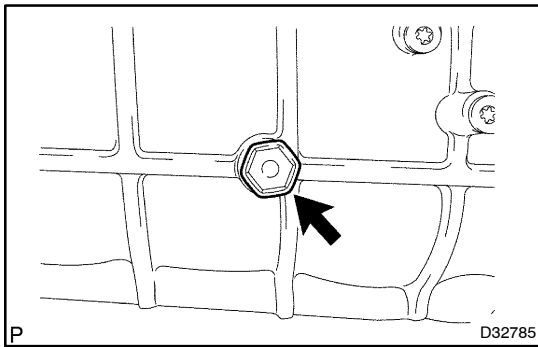
Torque: 14 N·m (143 kgf·cm, 10 ft·lbf)



88. INSTALL TRANSMISSION FILLER PLUG

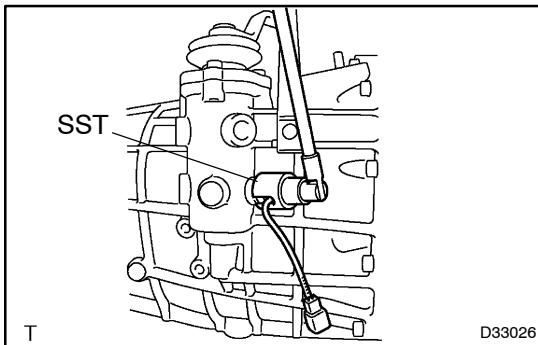
- (a) Install a new gasket and the filler plug to the transmission case.

Torque: 37 N·m (377 kgf·cm, 27 ft·lbf)

**89. INSTALL TRANSMISSION DRAIN PLUG**

- (a) Install a new gasket and the drain plug to the transmission case.

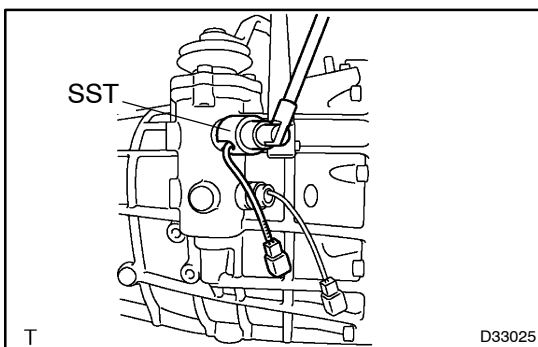
Torque: 37 N·m (377 kgf·cm, 27 ft·lbf)

**90. INSTALL EXHAUST BRAKE NEUTRAL SWITCH ASSY**

- (a) Using SST, install the neutral switch.

SST 09817-16011

Torque: 39 N·m (398 kgf·cm, 29 ft·lbf)

**91. INSTALL BACK UP LAMP SWITCH ASSY**

- (a) Using SST, install a new gasket and the back up switch.

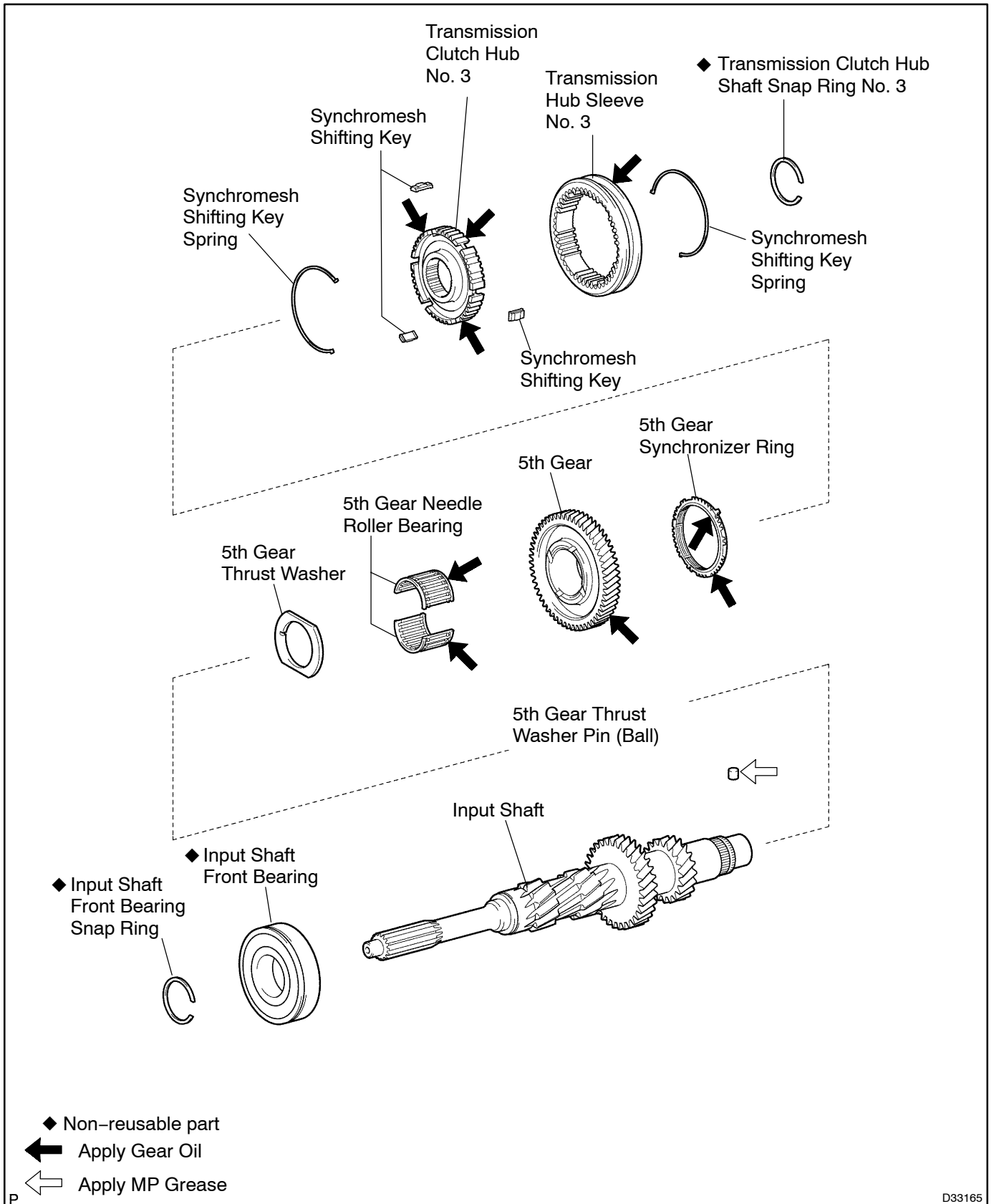
SST 09817-16011

Torque: 44 N·m (449 kgf·cm, 32 ft·lbf)

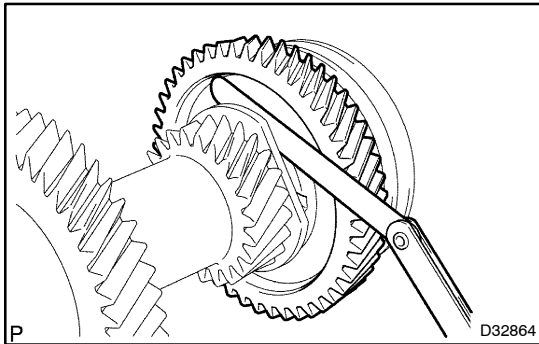
INPUT SHAFT ASSY (M550)

COMPONENTS

410CV-02



OVERHAUL



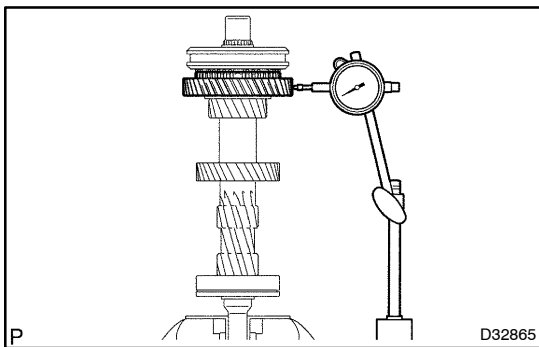
1. INSPECT 5TH GEAR THRUST CLEARANCE

- (a) Using a feeler gauge, measure the 5th gear thrust clearance.

Standard clearance:

0.10 to 0.35 mm (0.0039 to 0.0138 in.)

Maximum clearance: 0.35 mm (0.0138 in.)



2. INSPECT 5TH GEAR RADIAL CLEARANCE

- (a) Fix the input shaft through 2 protective aluminum plates in a vise.

- (b) Using a dial indicator, measure the 5th gear radial clearance.

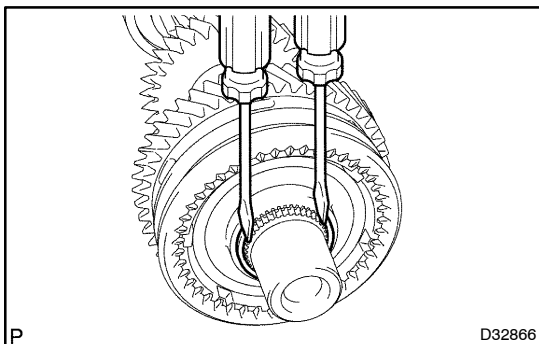
Standard clearance:

0.015 to 0.068 mm (0.0006 to 0.0027 in.)

Maximum clearance: 0.068 mm (0.0027 in.)

If the clearance exceeds the maximum, replace the gear, needle roller bearing or shaft.

- (c) Remove the input shaft from the vise.

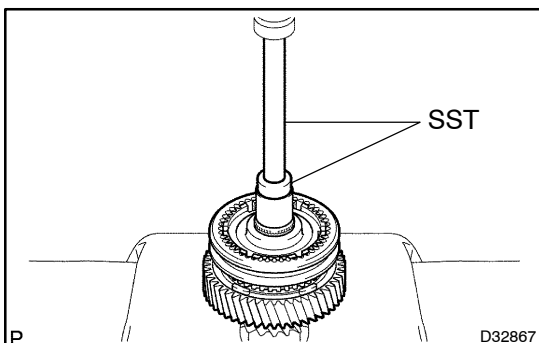


3. REMOVE TRANSMISSION CLUTCH HUB SHAFT SNAP RING NO. 3

- (a) Using 2 screwdrivers and a hammer, tap out the snap ring.

NOTICE:

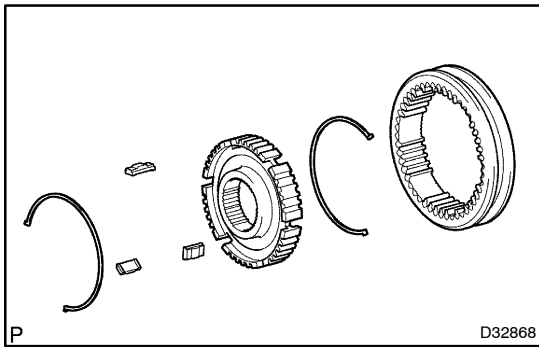
Use a shop rag to keep the shaft snap ring from flying.



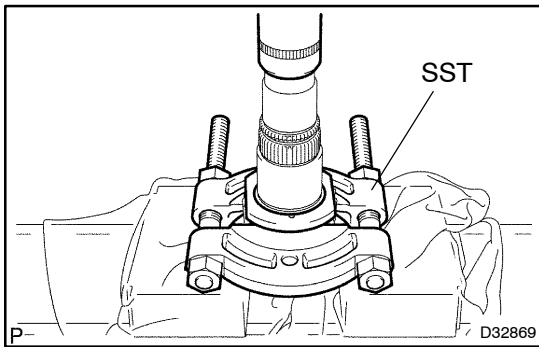
4. REMOVE 5TH GEAR

- (a) Using SST and a press, press out the 5th gear, clutch hub No. 3, needle roller bearing and synchronizer ring.

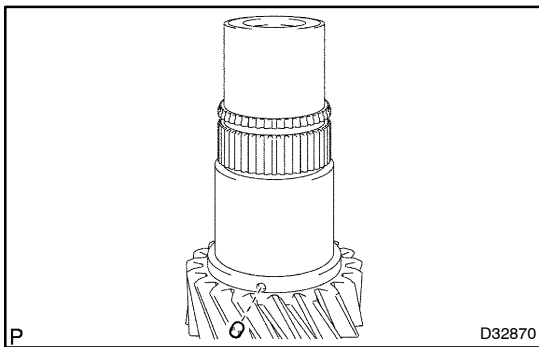
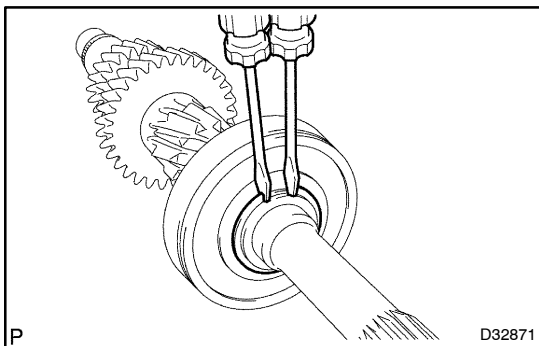
SST 09950-60010 (09951-00350), 09950-70010 (09951-07100)

**5. REMOVE TRANSMISSION CLUTCH HUB NO. 3**

- (a) Using a screwdriver, remove the 2 key springs, 3 keys, hub sleeve from the clutch hub No. 3.

**6. REMOVE 5TH GEAR THRUST WASHER**

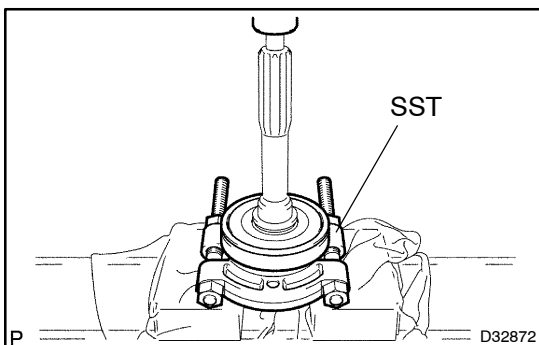
- (a) Using SST and a press, press out the thrust washer.
SST 09950-00020

**7. REMOVE 5TH GEAR THRUST WASHER PIN (BALL)****8. REMOVE INPUT SHAFT FRONT BEARING SNAP RING**

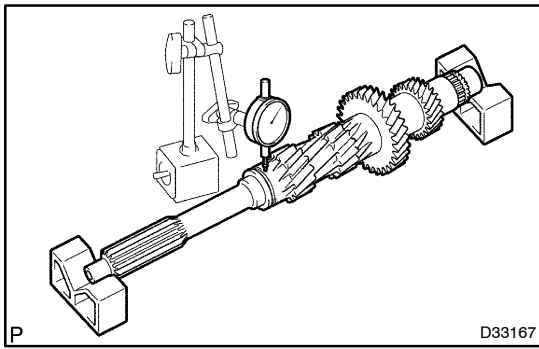
- (a) Using 2 screwdrivers and a hammer, tap out the snap ring.

NOTICE:

Use a shop rag to keep the shaft snap ring from flying.

**9. REMOVE INPUT SHAFT FRONT BEARING**

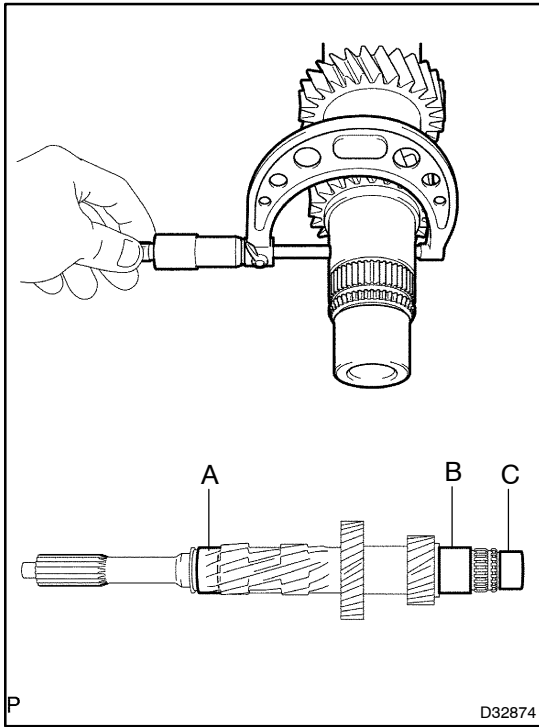
- (a) Using a press, press out the bearing.
SST 09950-00020



10. INSPECT INPUT SHAFT ASSY

- (a) Using a dial indicator, measure the input shaft runout.
Maximum runout: 0.015 mm (0.0006 in.)

If the runout exceeds the maximum, replace the input shaft assy.



- (b) Using a micrometer, measure the outer diameter of the input shaft journal surface.

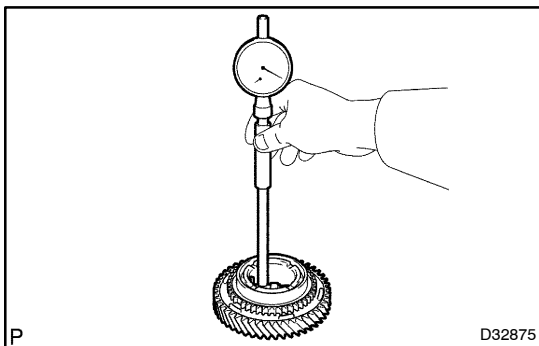
Standard:

| Part | Outer diameter |
|------|--|
| A | 47.002 to 47.018 mm (1.8505 to 1.8511 in.) |
| B | 47.984 to 48.000 mm (1.8891 to 1.8898 in.) |
| C | 38.118 to 38.130 mm (1.5007 to 1.5012 in.) |

Minimum:

| Part | Outer diameter |
|------|------------------------|
| A | 47.002 mm (1.8505 in.) |
| B | 47.984 mm (1.8891 in.) |
| C | 38.118 mm (1.5007 in.) |

If the diameter is less than the minimum, replace the input shaft.



11. INSPECT 5TH GEAR

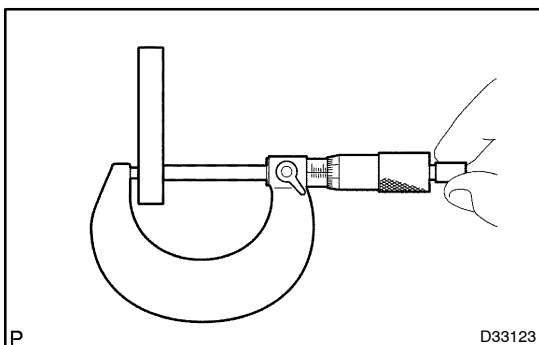
- (a) Using a cylinder gauge, measure the inside diameter of the gear.

Standard clearance:

55.015 to 55.040 mm (2.1659 to 2.1669 in.)

Maximum clearance: 55.040 mm (2.1669 in.)

If the clearance exceeds the maximum, replace the 5th gear.



12. INSPECT 5TH GEAR THRUST WASHER

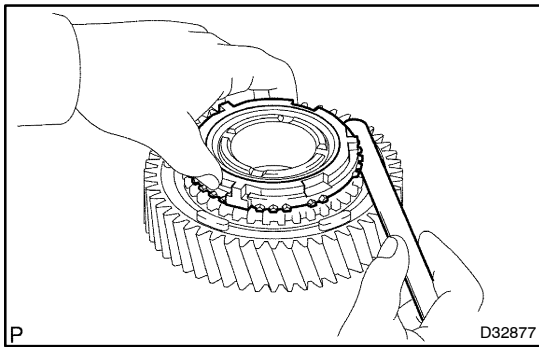
- (a) Using a micrometer, measure the thrust washer thickness.

Standard thickness:

4.95 to 5.05 mm (0.1945 to 0.2004 in.)

Minimum thickness: 4.95 mm (0.1945 in.)

If the thickness is less than the minimum, replace the 5th gear thrust washer.



13. INSPECT 5TH GEAR SYNCHRONIZER RING

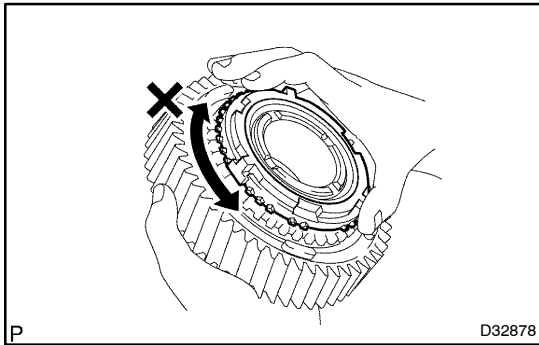
- (a) Using a feeler gauge, measure the clearance between the synchronizer ring and gear spline.

Standard clearance:

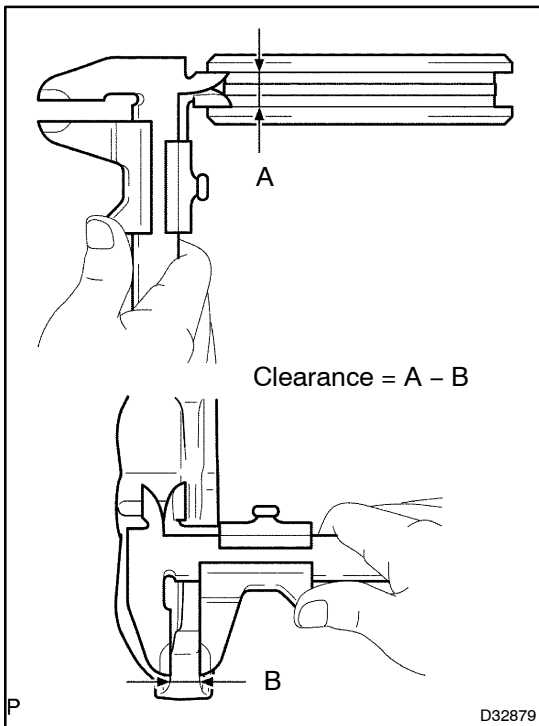
0.78 to 1.62 mm (0.0307 to 0.0638 in.)

Minimum clearance: 0.78 mm (0.0307 in.)

If the clearance is less than the minimum, replace the synchronizer ring.



- (b) Coat the 5th gear cone with gear oil. Check the braking effect of the synchronizer ring. Turn the synchronizer ring in one direction while pushing it to the gear cone. Check that the ring locks.



14. INSPECT TRANSMISSION HUB SLEEVE NO. 3

- (a) Using a vernier caliper, measure the wide of the hub sleeve and thickness of the gear shift fork No. 3 as shown in the illustration.

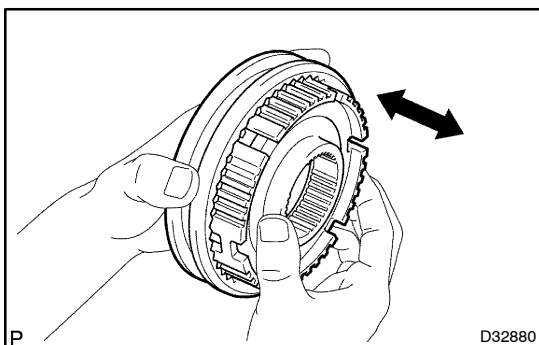
- (b) Calculate the clearance using the formula below

Formula:

Clearance = A - B

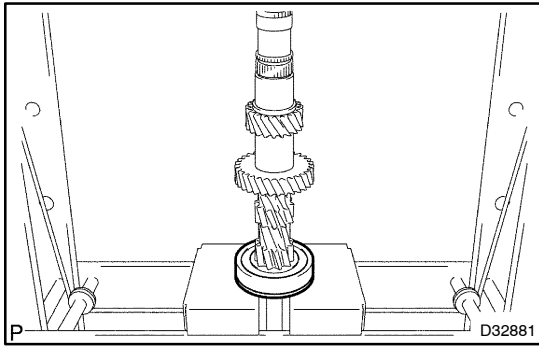
Standard: 0.15 to 0.26 mm (0.0059 to 0.0102 in.)

If the clearance not as specified, replace the transmission hub sleeve No. 3 and gear shift fork No. 3.

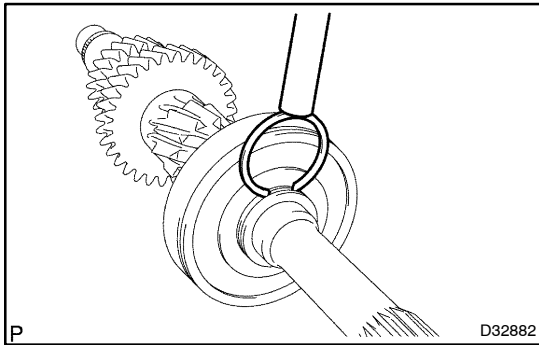


- (c) Check the sliding condition between the hub sleeve and clutch hub.

- (d) Check that the spline gear's edges of the hub sleeve are not worn down.

**15. INSTALL INPUT SHAFT FRONT BEARING**

- (a) Using a press, press in a new bearing.

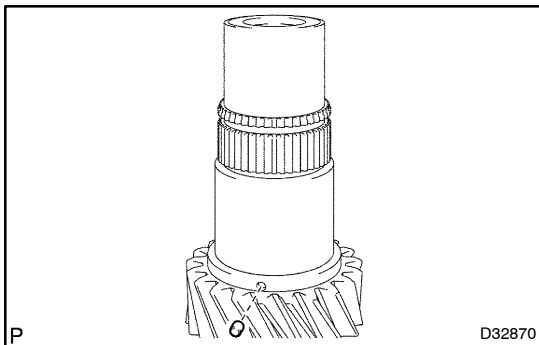
**16. INSTALL INPUT SHAFT FRONT BEARING SNAP RING**

- (a) Select a snap ring that allows minimum axial play.

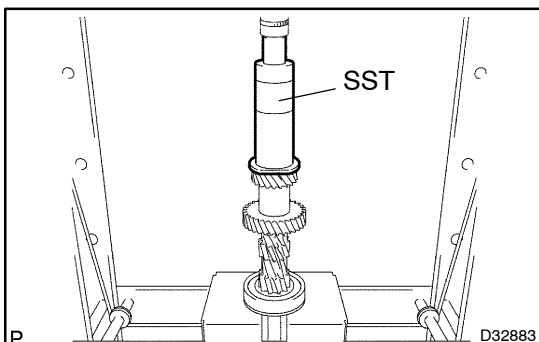
Standard clearance: 0.10 mm (0.0039 in.) or less

| Mark | Specified Condition |
|------|--|
| A | 3.00 to 3.05 mm (0.1181 to 0.1201 in.) |
| B | 3.05 to 3.10 mm (0.1201 to 0.1220 in.) |
| C | 3.10 to 3.15 mm (0.1220 to 0.1240 in.) |
| D | 3.15 to 3.20 mm (0.1240 to 0.1260 in.) |
| E | 3.20 to 3.25 mm (0.1260 to 0.1280 in.) |
| F | 3.25 to 3.30 mm (0.1280 to 0.1300 in.) |

- (b) Using a brass bar and hammer, tap in the snap ring.

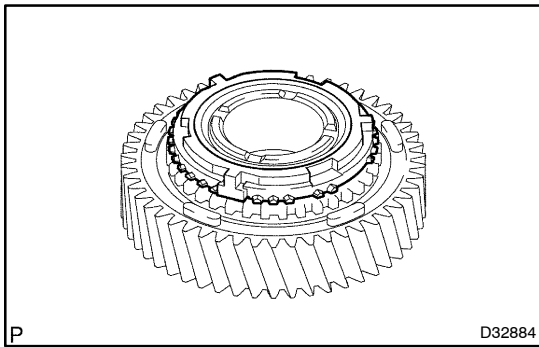
**17. INSTALL 5TH GEAR THRUST WASHER PIN (BALL)**

- (a) Coat the pin (ball) with gear oil and install it.

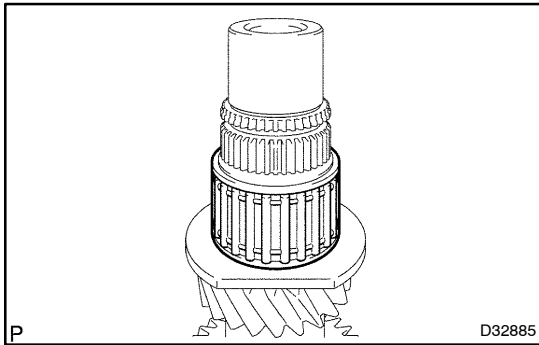
**18. INSTALL 5TH GEAR THRUST WASHER**

- (a) Using SST and a press, press in the thrust washer.

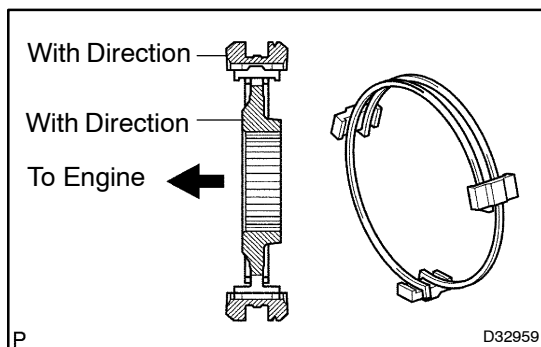
SST 09316-60011 (09316-00011)

**19. INSTALL 5TH GEAR SYNCHRONIZER RING**

- (a) Coat the synchronizer ring with gear oil and install it to the 5th gear.

**20. INSTALL 5TH GEAR NEEDLE ROLLER BEARING**

- (a) Coat the bearing with gear oil and install it.

**21. INSTALL TRANSMISSION CLUTCH HUB NO. 3**

- (a) Coat the hub sleeve with gear oil and install it to the clutch hub.

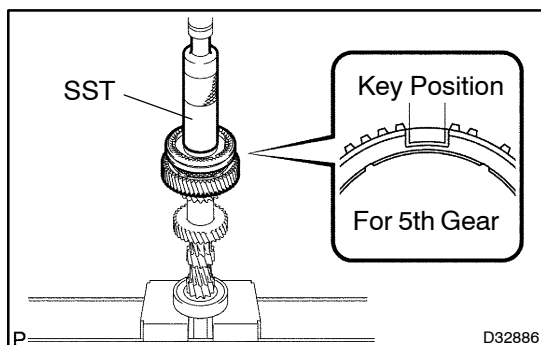
HINT:

Set the hub sleeve and the clutch hub in correct orientation.

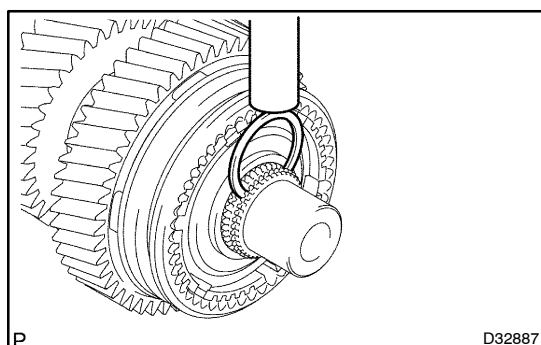
- (b) Install the 2 key springs and 3 keys to the hub sleeve.

NOTICE:

Do not set both opening of the shifting key springs in the same position.

**22. INSTALL 5TH GEAR**

- (a) Coat the gear with gear oil.
 (b) Using SST and a press, press in the gear.
 SST 09316-60011 (09316-00011)

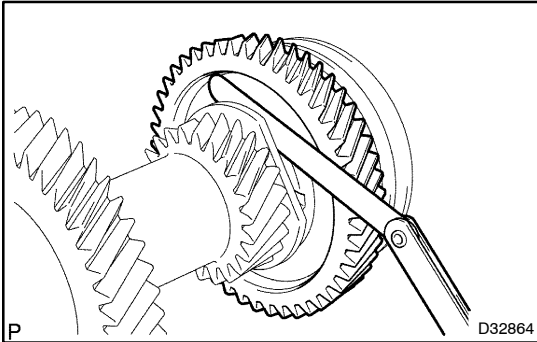
**23. INSTALL TRANSMISSION CLUTCH HUB SHAFT SNAP RING NO. 3**

- (a) Select a snap ring that will allow minimum axial play.
Standard clearance: 0.10 mm (0.0039 in.) or less

| Mark | Specified Condition |
|------|--|
| A | 2.60 to 2.65 mm (0.1024 to 0.1043 in.) |
| B | 2.65 to 2.70 mm (0.1043 to 0.1063 in.) |
| C | 2.70 to 2.75 mm (0.1063 to 0.1083 in.) |
| D | 2.75 to 2.80 mm (0.1083 to 0.1102 in.) |

| Mark | Specified Condition |
|------|--|
| E | 2.80 to 2.85 mm (0.1102 to 0.1122 in.) |
| F | 2.85 to 2.90 mm (0.1122 to 0.1142 in.) |

- (b) Using a brass bar and hammer, and tap in the snap ring.



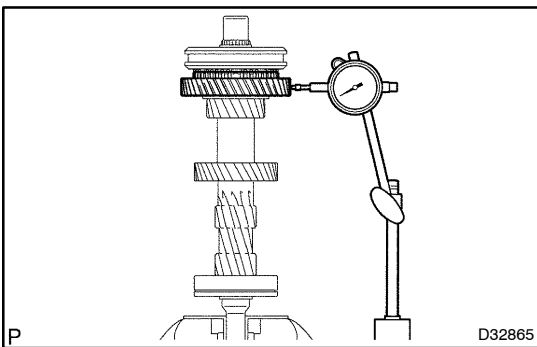
24. INSPECT 5TH GEAR THRUST CLEARANCE

- (a) Using a feeler gauge, measure the gear thrust clearance.

Standard clearance:

0.10 to 0.35 mm (0.0039 to 0.0138 in.)

Maximum clearance: 0.35 mm (0.0138 in.)



25. INSPECT 5TH GEAR RADIAL CLEARANCE

- (a) Using a dial indicator, measure the radial clearance between the gear and shaft.

Standard clearance:

0.015 to 0.068 mm (0.0006 to 0.0027 in.)

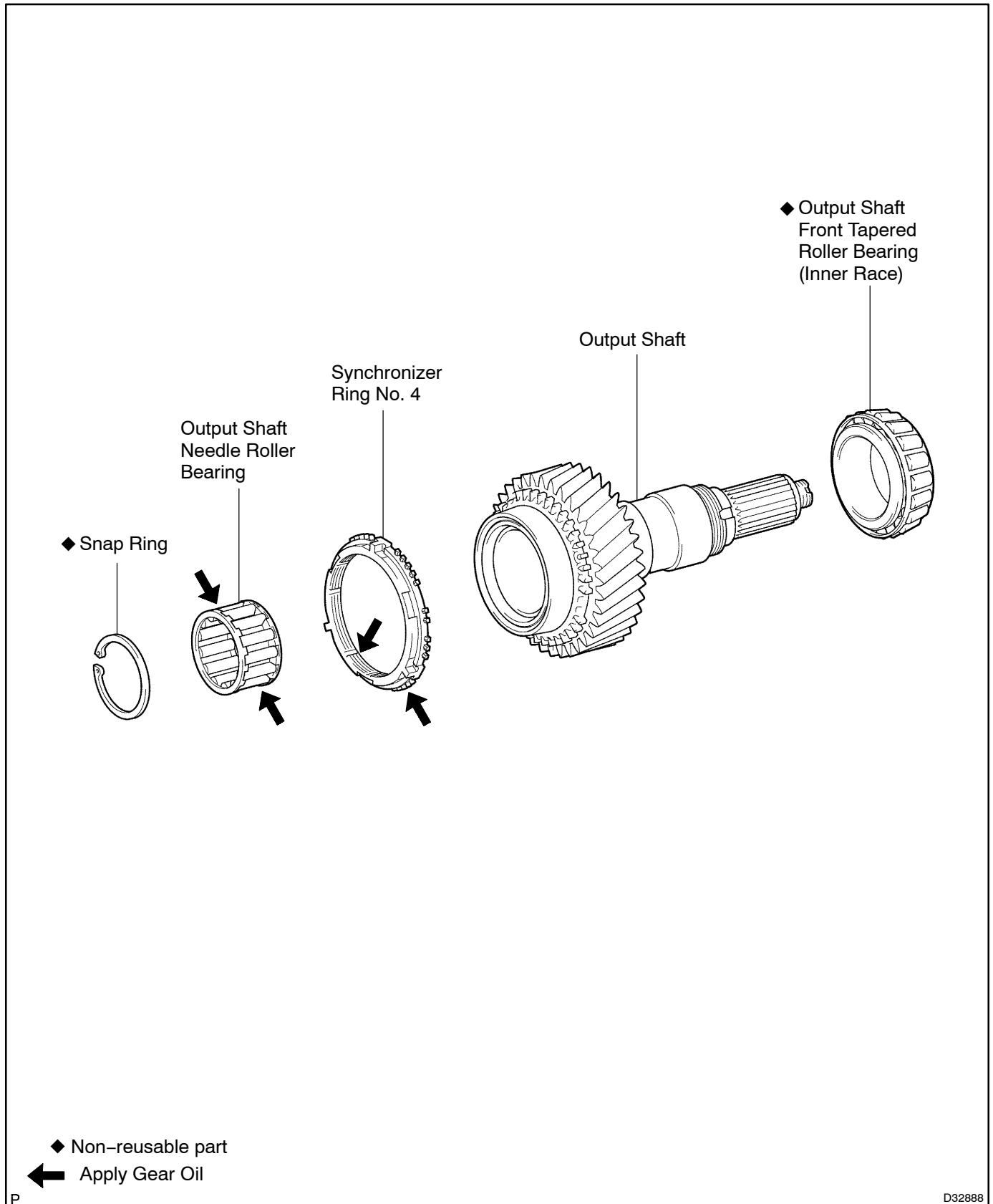
Maximum clearance: 0.068 mm (0.0027 in.)

If the clearance is not as specified, replace the 5th gear needle roller bearing.

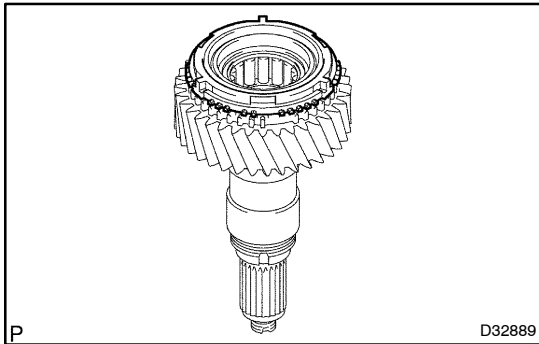
OUTPUT SHAFT ASSY (M550)

COMPONENTS

410CX-02

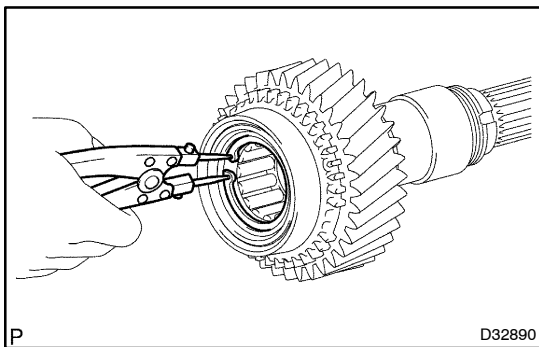


OVERHAUL



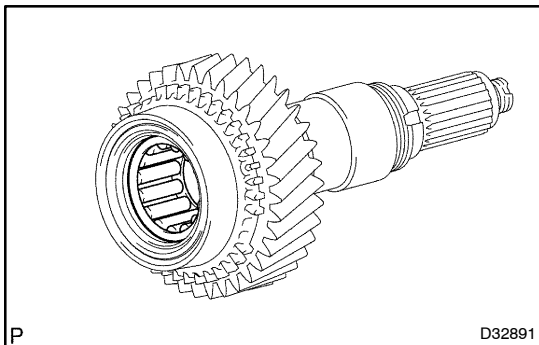
1. REMOVE SYNCHRONIZER RING NO. 4

- (a) Remove the synchronizer ring.

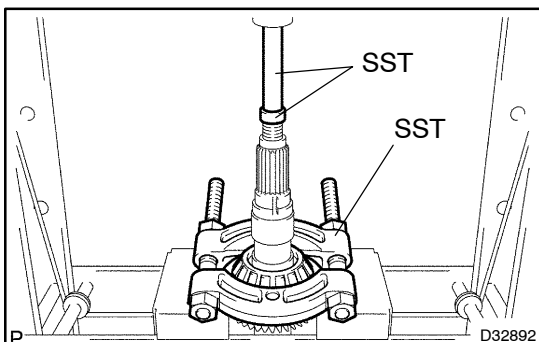


2. REMOVE OUTPUT SHAFT NEEDLE ROLLER BEARING

- (a) Using a snap ring plier, remove the snap ring.



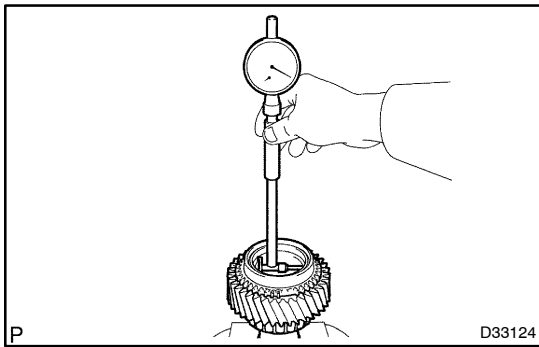
- (b) Remove the needle roller bearing.



3. REMOVE OUTPUT SHAFT FRONT TAPERED ROLLER BEARING (INNER RACE)

- (a) Using SST and a press, press in the roller bearing (inner race).

SST 09950-00020 09950-60010 (09951-00290)
09950-70010 (09951-07100)



4. INSPECT OUTPUT SHAFT

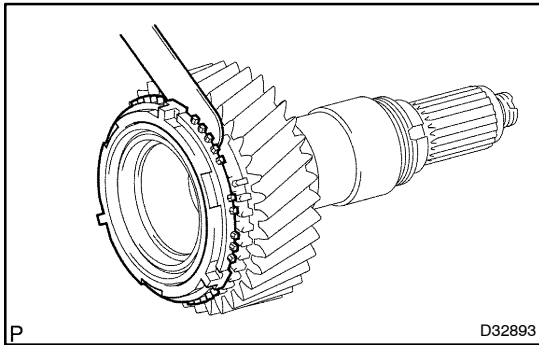
- (a) Using a cylinder gauge, measure the inside diameter of the output shaft bearing race.

Standard inside diameter:

54.17 to 54.187 mm (2.1327 to 2.1333 in.)

Maximum inside diameter: 54.187 mm (2.1333 in.)

If the diameter exceeds the maximum, replace the output shaft.



5. INSPECT SYNCHRONIZER RING NO. 4

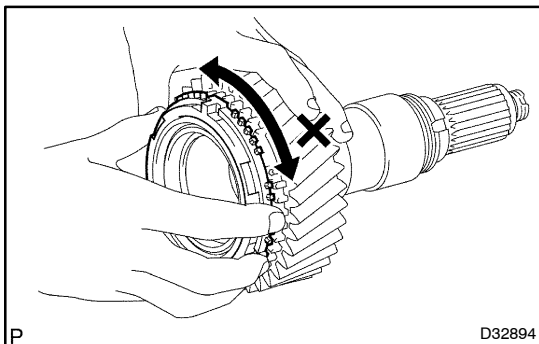
- (a) Using a feeder gauge, measure the clearance between the synchronizer ring and gear spline.

Standard clearance:

0.78 to 1.62 mm (0.0307 to 0.0638 in.)

Minimum clearance: 0.78 mm (0.0307 in.)

If the clearance is less than the minimum, replace the synchronizer ring.



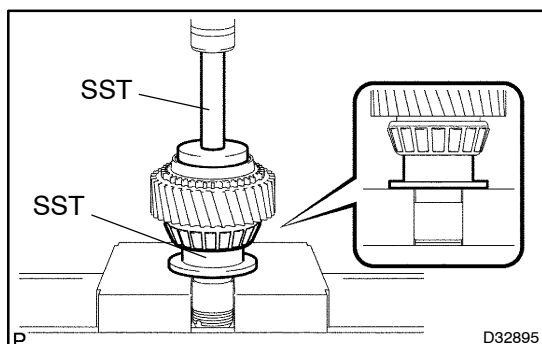
- (b) Coat the output shaft and synchronizer ring cone with gear oil. Check the braking effect of the synchronizer ring. Turn the synchronizer ring in one direction while pushing it to the gear cone. Check that the ring locks.

If the braking effect is insufficient, apply a small amount of the fine lapping compound between the synchronizer ring and 4th gear cone. Lightly rub the synchronizer ring and 4th gear cone together.

NOTICE:

Ensure the fine lapping compound is completely washed off after rubbing.

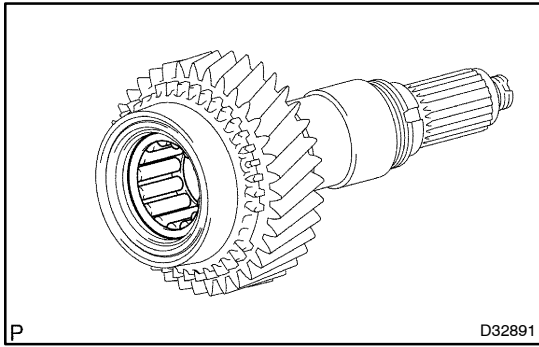
- (c) Check again the braking effect of the synchronizer ring.



6. INSTALL OUTPUT SHAFT FRONT TAPERED ROLLER BEARING

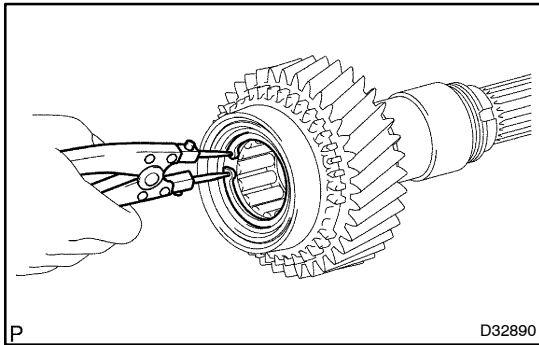
- (a) Using SST and a press, press in a new bearing (inner race).

SST 09316-20011, 09950-70010 (09951-07100),
09951-00700

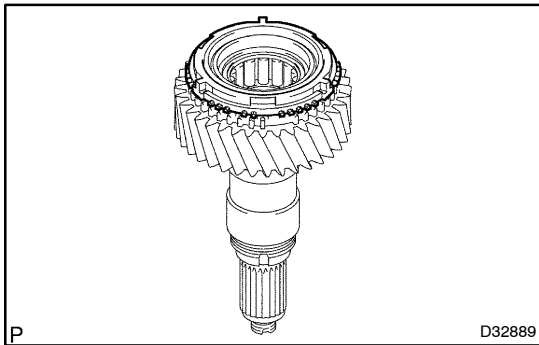


7. INSTALL OUTPUT SHAFT NEEDLE ROLLER BEARING

(a) Coat the needle roller bearing with gear oil, and install it.



(b) Using a snap ring plier, install a new snap ring.



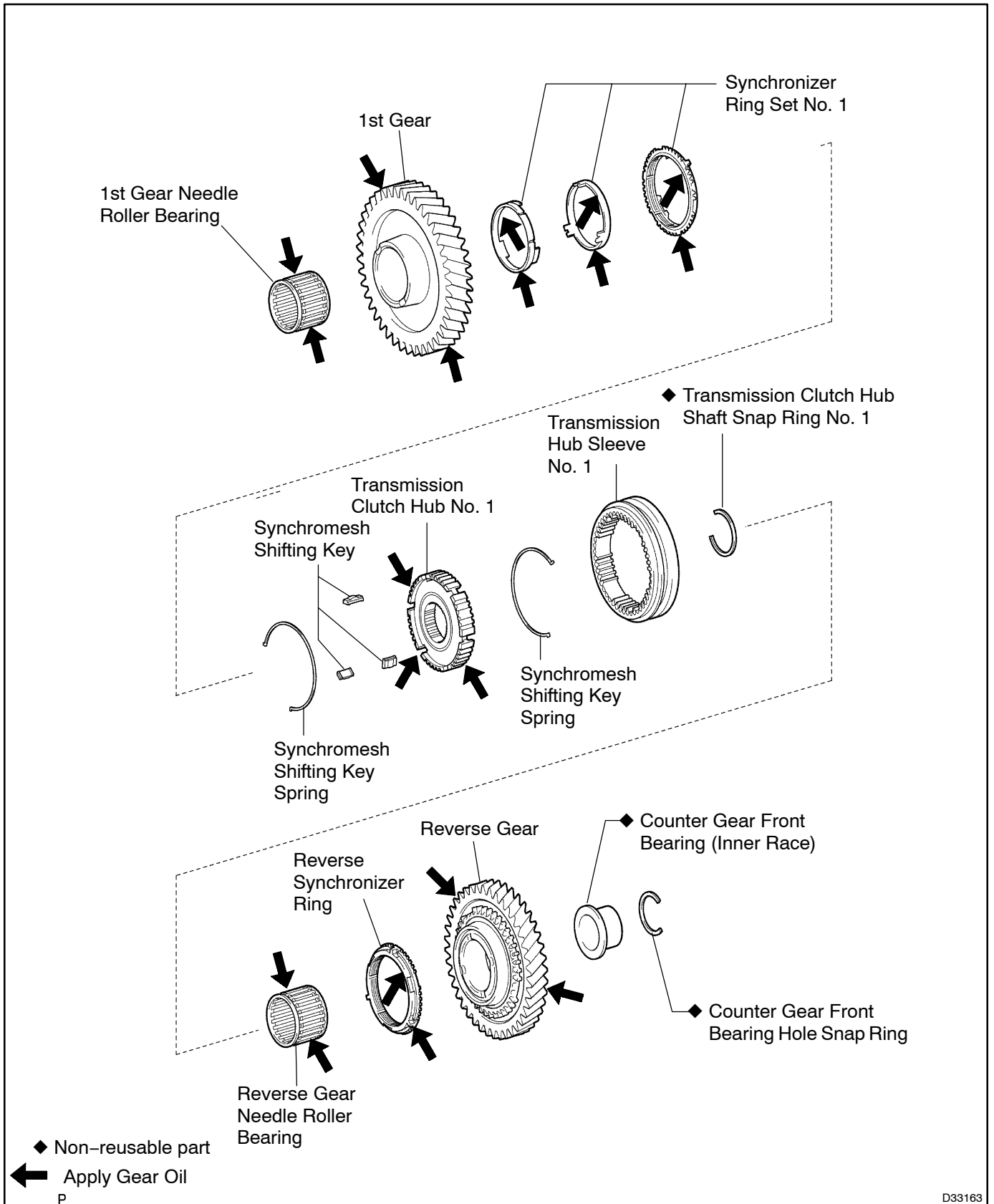
8. INSTALL SYNCHRONIZER RING NO. 4

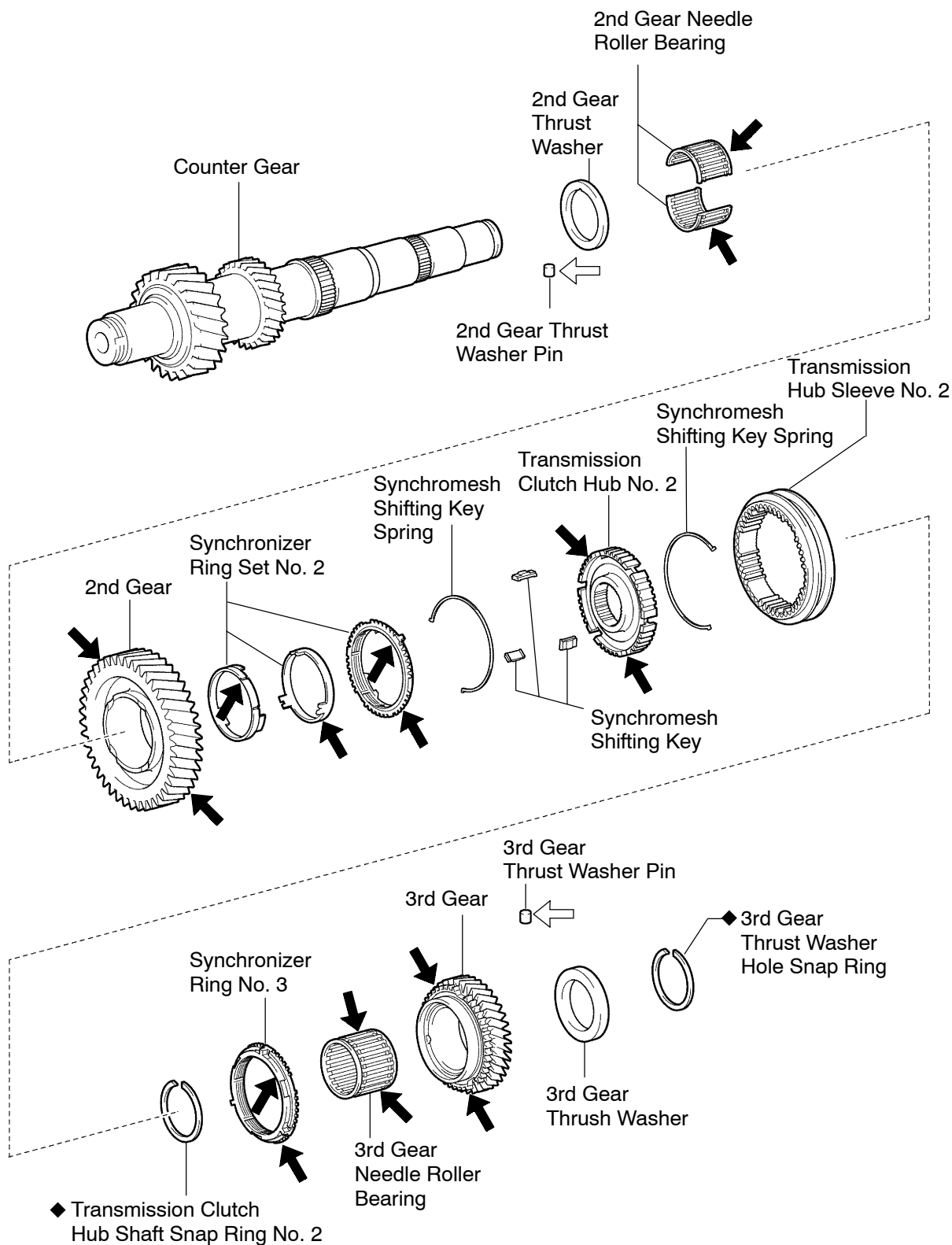
(a) Coat the synchronizer ring with gear oil and install it.

COUNTER GEAR ASSY (M550)

COMPONENTS

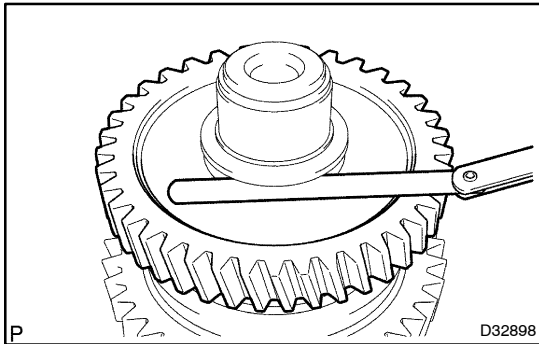
410HH-01





- ◆ Non-reusable part
- ← Apply Gear Oil
- ← Apply MP Grease

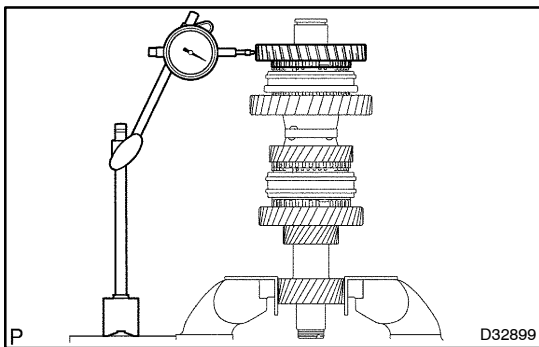
OVERHAUL



1. **INSPECT REVERSE GEAR THRUST CLEARANCE**
 - (a) Fix the counter gear through 2 protective aluminum plates in a vise
 - (b) Using a feeler gauge, measure the counter gear thrust clearance.

Standard clearance:
0.10 to 0.45 mm (0.0039 to 0.0177 in.)

Maximum clearance: 0.45 mm (0.0177 in.)

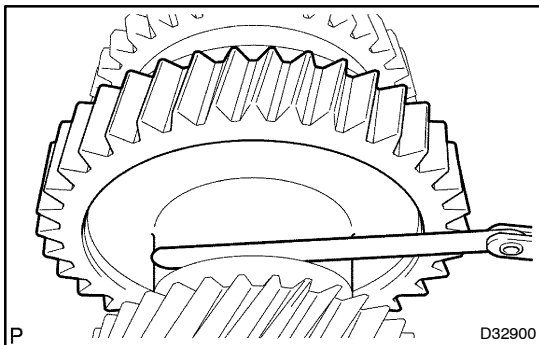


2. **INSPECT REVERSE GEAR RADIAL CLEARANCE**
 - (a) Using a dial indicator, measure the reverse gear radial clearance between the gear and shaft.

Standard clearance:
0.015 to 0.068 mm (0.0006 to 0.0027 in.)

Maximum clearance: 0.068 mm (0.0027 in.)

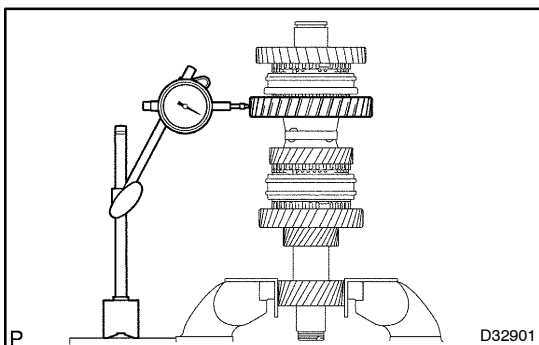
If the clearance exceeds the maximum, replace the reverse gear needle roller bearing.



3. **INSPECT 1ST GEAR THRUST CLEARANCE**
 - (a) Using a feeler gauge, measure the gear thrust clearance.

Standard clearance:
0.10 to 0.45 mm (0.0039 to 0.0177 in.)

Maximum clearance: 0.45 mm (0.0177 in.)

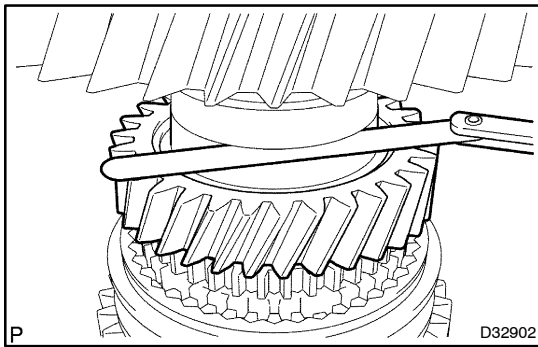


4. **INSPECT 1ST GEAR RADIAL CLEARANCE**
 - (a) Using a dial indicator, measure the 1st gear radial clearance between the gear and shaft.

Standard clearance:
0.015 to 0.068 mm (0.0006 to 0.0027 in.)

Maximum clearance: 0.068 mm (0.0027 in.)

If the clearance exceeds the maximum, replace the gear needle roller bearing.



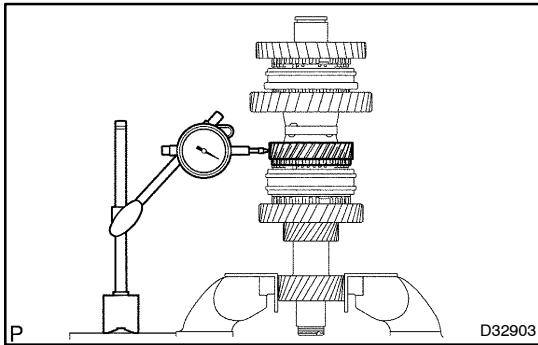
5. INSPECT 3RD GEAR THRUST CLEARANCE

- (a) Using a feeler gauge, measure the gear thrust clearance.

Standard clearance:

0.10 to 0.45 mm (0.0039 to 0.0177 in.)

Maximum clearance: 0.45 mm (0.0177 in.)



6. INSPECT 3RD GEAR RADIAL CLEARANCE

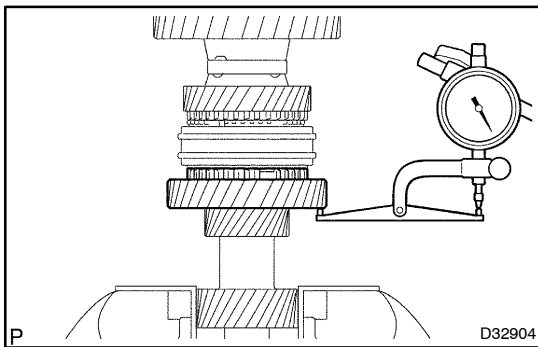
- (a) Using a dial indicator, measure the gear radial clearance between the gear and shaft.

Standard clearance:

0.015 to 0.068 mm (0.0006 to 0.0027 in.)

Maximum clearance: 0.068 mm (0.0027 in.)

If the clearance exceeds the maximum, replace the 3rd gear needle roller bearing.



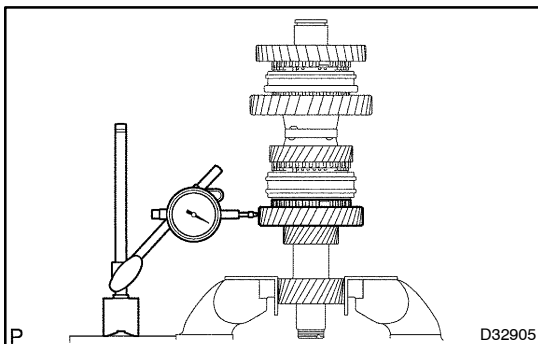
7. INSPECT 2ND GEAR THRUST CLEARANCE

- (a) Using a dial indicator, measure the gear thrust clearance.

Standard clearance:

0.10 to 0.35 mm (0.0039 to 0.0138 in.)

Maximum clearance: 0.35 mm (0.0138 in.)



8. INSPECT 2ND GEAR RADIAL CLEARANCE

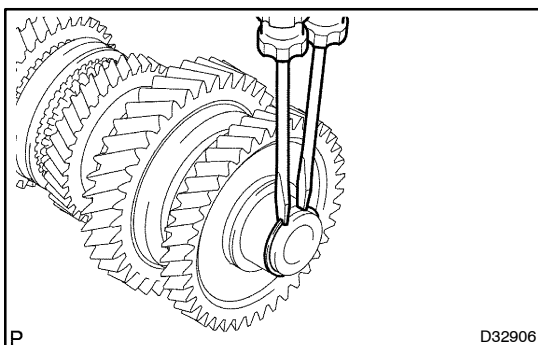
- (a) Using a dial indicator, measure the gear radial clearance between the gear and shaft.

Standard clearance:

0.015 to 0.068 mm (0.0006 to 0.0027 in.)

Maximum clearance: 0.068 mm (0.0027 in.)

If the clearance exceeds the maximum, replace the 2nd gear needle roller bearing.

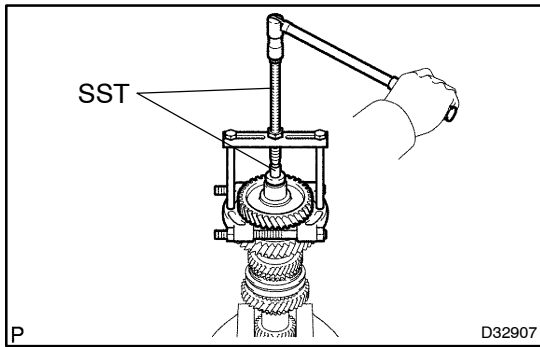


9. REMOVE COUNTER GEAR FRONT BEARING HOLE SNAP RING

- (a) Using 2 screwdrivers and a hammer, tap out the snap ring.

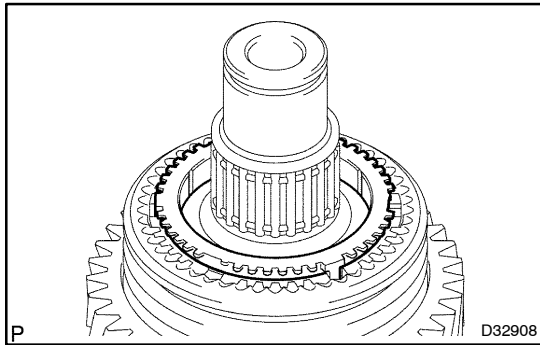
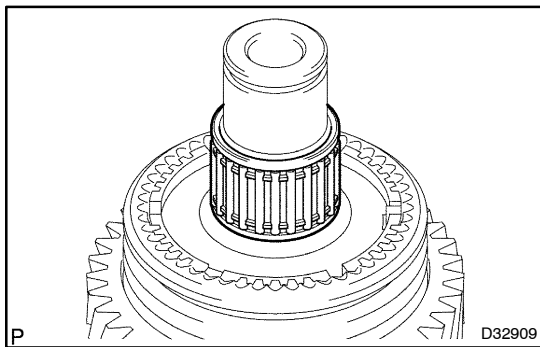
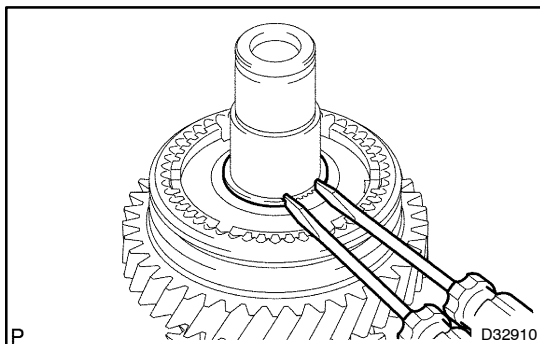
NOTICE:

Use a shop rag to keep the shaft snap ring from flying.

**10. REMOVE REVERSE GEAR**

- (a) Using SST, remove the reverse gear and counter gear front bearing (inner race).

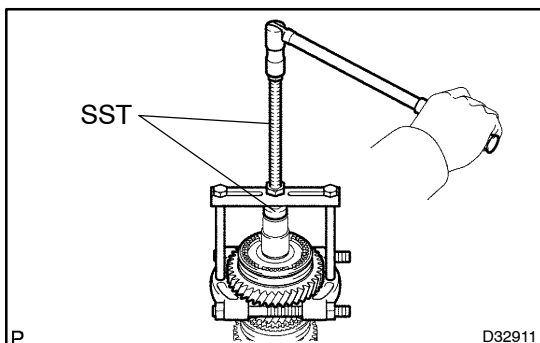
SST 09950-00020, 09950-00030, 09950-40011
(09957-04010), 09950-60010 (09951-00180,
09951-00370, 09952-06010)

**11. REMOVE REVERSE SYNCHRONIZER RING****12. REMOVE REVERSE GEAR NEEDLE ROLLER BEARING****13. REMOVE TRANSMISSION CLUTCH HUB SHAFT SNAP RING NO. 1**

- (a) Using 2 screwdrivers and a hammer, tap out the snap ring.

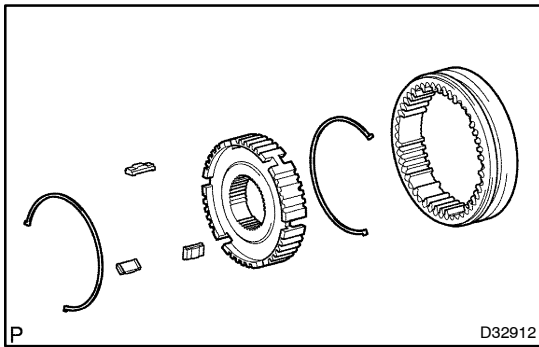
NOTICE:

Use a shop rag to keep the shaft snap ring from flying.

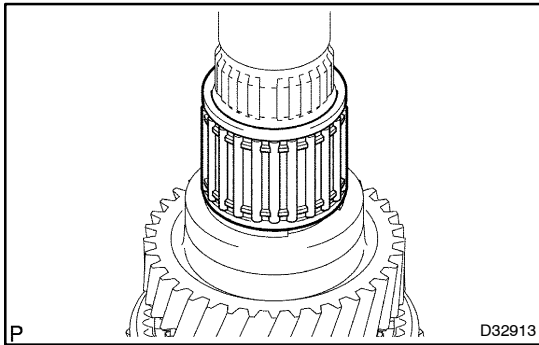
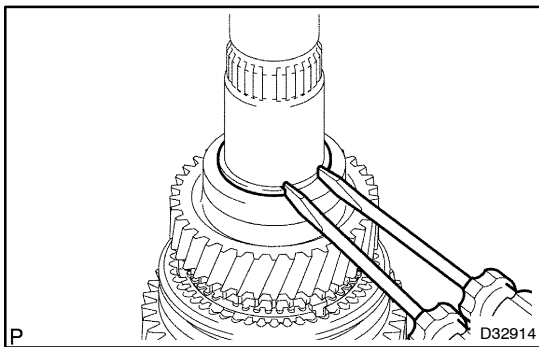
**14. REMOVE 1ST GEAR**

- (a) Using SST, remove the 1st gear, transmission clutch hub No. 1 and synchronizer ring.

SST 09950-00020, 09950-00030, 09950-40011
(09957-04010), 09950-60010 (09951-00370)

**15. REMOVE TRANSMISSION CLUTCH HUB NO. 1**

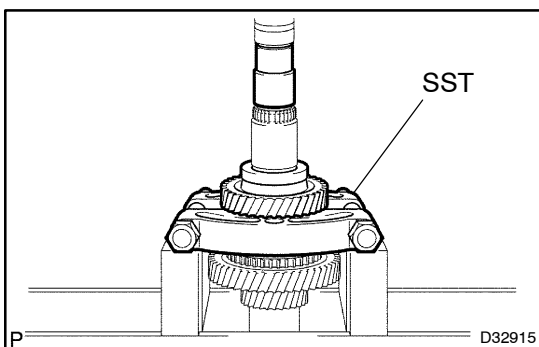
- (a) Using a screwdriver, remove the 2 key springs, 3 keys and hub sleeve from the clutch hub.

**16. REMOVE 1ST GEAR NEEDLE ROLLER BEARING****17. REMOVE 3RD GEAR THRUST WASHER HOLE SNAP RING**

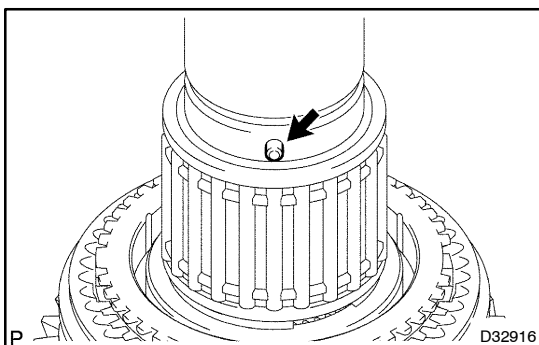
- (a) Using 2 screwdrivers and a hammer, tap out the hole snap ring from the counter gear.

NOTICE:

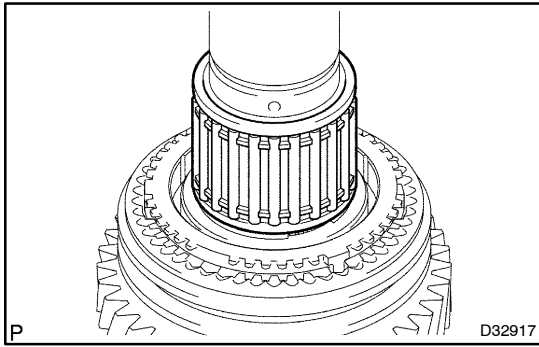
Use a shop rag to keep the shaft snap ring from flying.

**18. REMOVE 3RD GEAR**

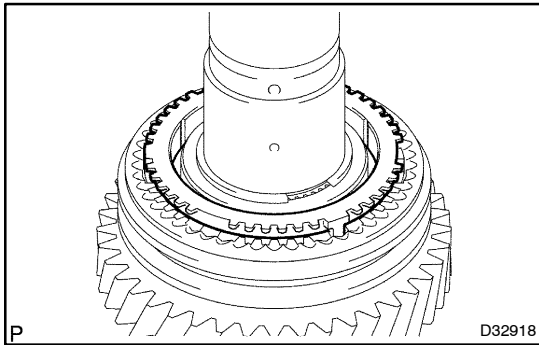
- (a) Using SST and a press, press out the thrust washer.
SST 09950-00020

**19. REMOVE 3RD GEAR THRUST WASHER PIN**

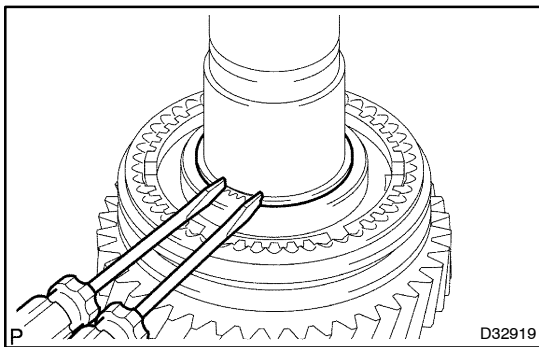
- (a) Remove the pin.



20. REMOVE 3RD GEAR NEEDLE ROLLER BEARING



21. REMOVE SYNCHRONIZER RING NO. 3

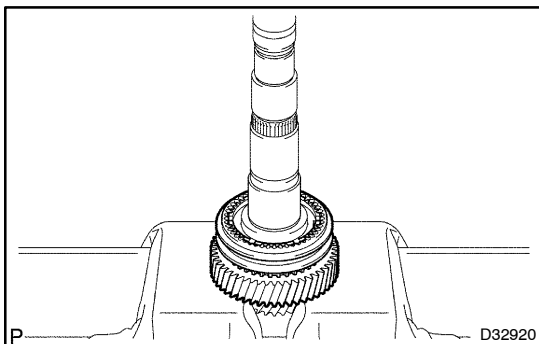


22. REMOVE TRANSMISSION CLUTCH HUB SHAFT SNAP RING NO. 2

- (a) Using 2 screwdrivers and a hammer, tap out snap ring.

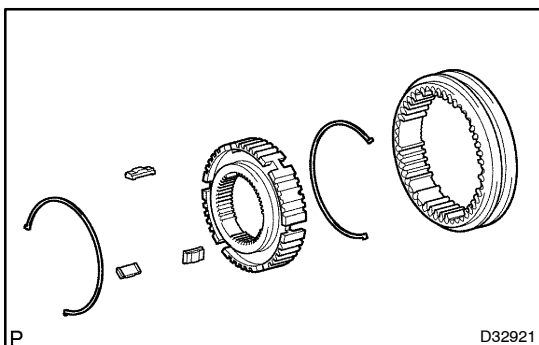
NOTICE:

Use a shop rag to keep the shaft snap ring from flying.



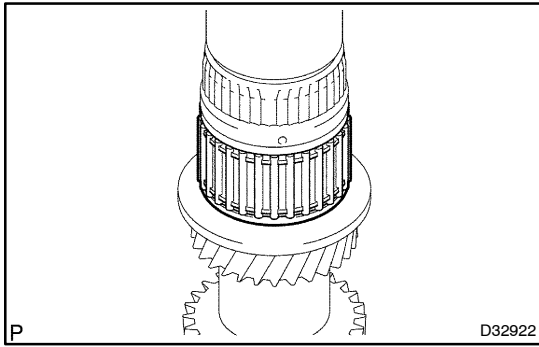
23. REMOVE 2ND GEAR

- (a) Using a press, press out the 2nd gear, transmission clutch hub No. 2 and synchronizer ring.

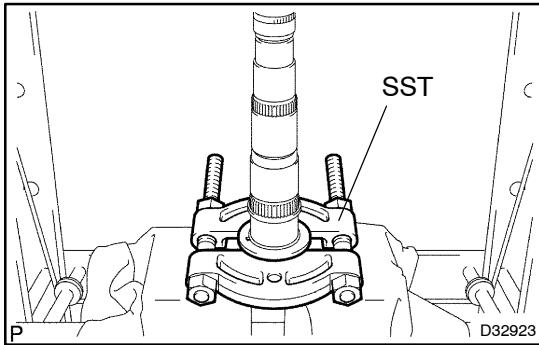


24. REMOVE TRANSMISSION CLUTCH HUB NO. 2

- (a) Using a screwdriver, remove the 2 key springs, 3 keys and hub sleeve from the clutch hub.

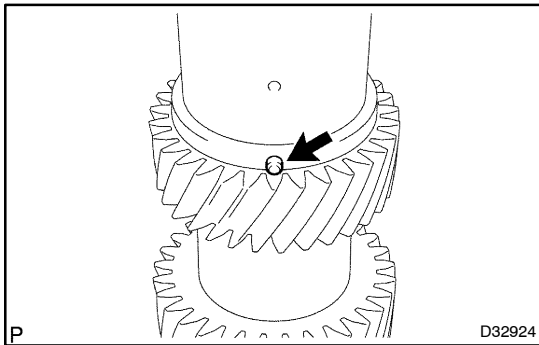


25. REMOVE 2ND GEAR NEEDLE ROLLER BEARING

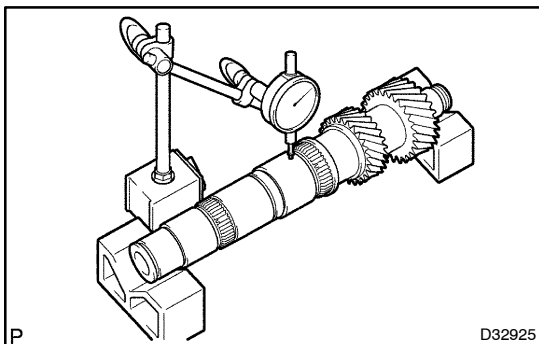


26. REMOVE 2ND GEAR THRUST WASHER

- (a) Using SST and a press, press out the thrust washer.
SST 09950-00020

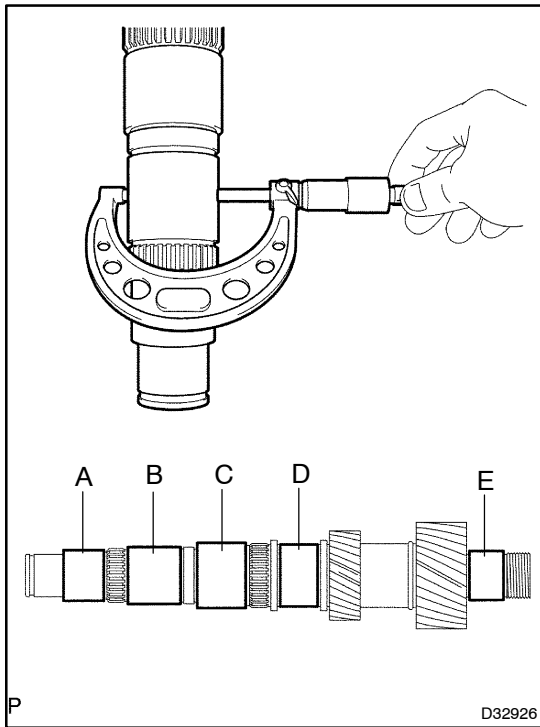


27. REMOVE 2 ND GEAR THRUST WASHER PIN



28. INSPECT COUNTER GEAR ASSY

- (a) Using a dial indicator, measure for the shaft runout.
Maximum runout: 0.015 mm (0.0006 in.)
If the runout exceeds the maximum, replace the counter shaft assy.



- (b) Using a micrometer, measure the diameter of the counter shaft journal surface.

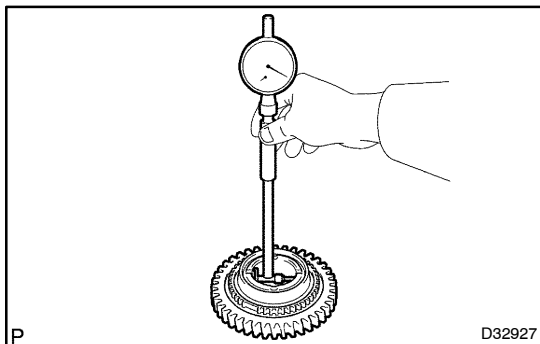
Standard:

| Part | Outer diameter |
|------|--|
| A | 43.484 to 43.500 mm (1.7120 to 1.7126 in.) |
| B | 48.984 to 49.000 mm (1.9285 to 1.9291 in.) |
| C | 53.984 to 54.000 mm (2.1253 to 2.1260 in.) |
| D | 53.984 to 54.000 mm (2.1253 to 2.1260 in.) |
| E | 40.002 to 40.018 mm (1.5749 to 1.5755 in.) |

Minimum:

| Part | Outer diameter |
|------|------------------------|
| A | 43.484 mm (1.7120 in.) |
| B | 48.984 mm (1.9285 in.) |
| C | 53.984 mm (2.1253 in.) |
| D | 53.984 mm (2.1253 in.) |
| E | 40.002 mm (1.5749 in.) |

If the diameter is less than the minimum, replace the output shaft.



29. INSPECT REVERSE GEAR

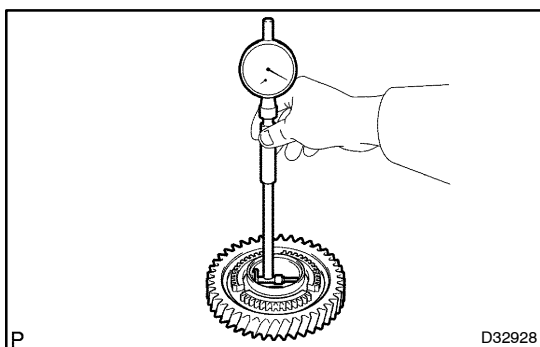
- (a) Using a cylinder gauge, measure the inside diameter of the gear.

Standard inside diameter:

50.515 to 50.540 mm (1.9888 to 1.9898 in.)

Maximum inside diameter: 50.540 mm (1.9898 in.)

If the inside diameter exceeds the maximum, replace the reverse gear.



30. INSPECT 1ST GEAR

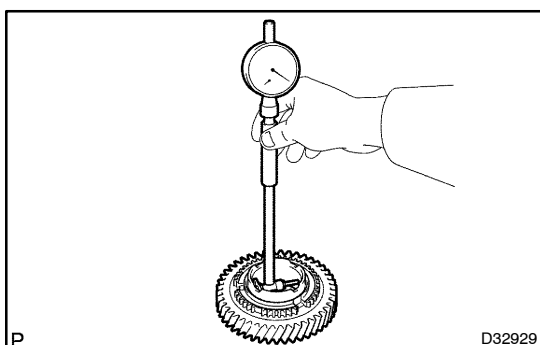
- (a) Using a cylinder gauge, measure the inside diameter of the gear.

Standard inside diameter:

56.015 to 56.040 mm (2.2053 to 2.2063 in.)

Maximum inside diameter: 56.040 mm (2.2063 in.)

If the inside diameter exceeds the maximum, replace the 1st gear.



31. INSPECT 2ND GEAR

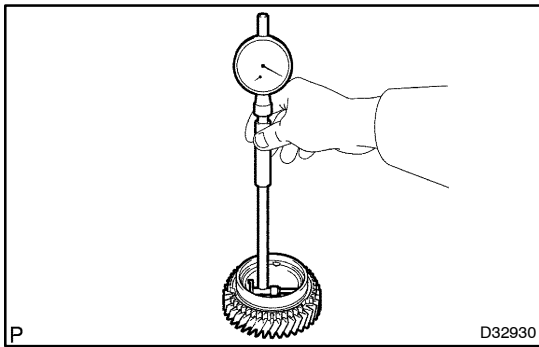
- (a) Using a cylinder gauge, measure the inside diameter of the gear.

Standard inside diameter:

61.015 to 61.040 mm (2.4022 to 2.4031 in.)

Maximum inside diameter: 61.040 mm (2.4031 in.)

If the inside diameter exceeds the maximum, replace the 2nd gear.

**32. INSPECT 3RD GEAR**

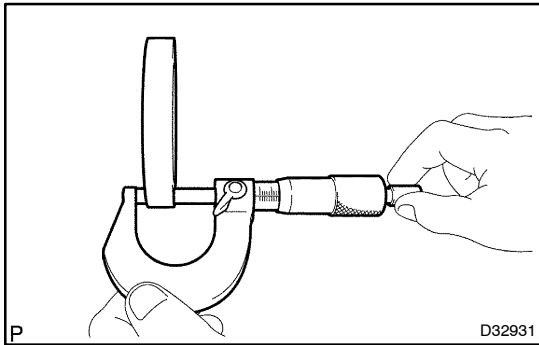
- (a) Using a cylinder gauge, measure the inside diameter of the 3rd gear.

Standard inside diameter:

61.015 to 61.040 mm (2.4022 to 2.4031 in.)

Maximum inside diameter: 61.040 mm (2.4031 in.)

If the inside diameter exceeds the maximum, replace the 3rd gear.

**33. INSPECT 3RD GEAR THRUST WASHER**

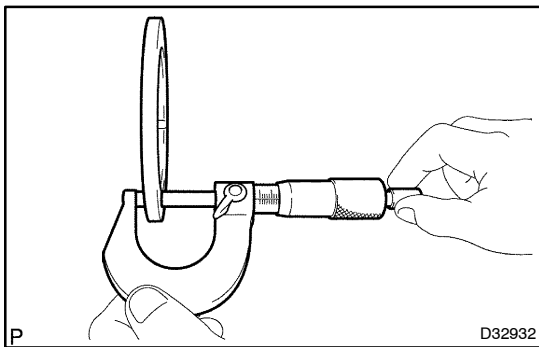
- (a) Using a micrometer, measure the thrust washer thickness.

Standard thickness:

11.45 to 11.55 mm (0.4508 to 0.4547 in.)

Minimum thickness: 11.45 mm (0.4508 in.)

If the thickness is less than the minimum, replace the 3rd gear thrust washer.

**34. INSPECT 2ND GEAR THRUST WASHER**

- (a) Using a micrometer, measure the thrust washer thickness.

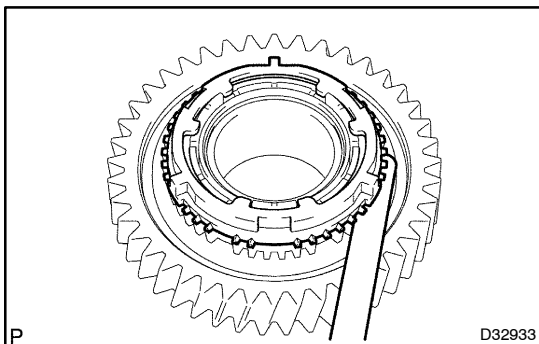
Standard thickness:

5.45 to 5.55 mm (0.2146 to 0.2185 in.)

Minimum thickness:

5.45 mm (0.2146 in.)

If the thickness is less than the minimum, replace the 2nd gear thrust washer.

**35. INSPECT SYNCHRONIZER RING SET NO. 1**

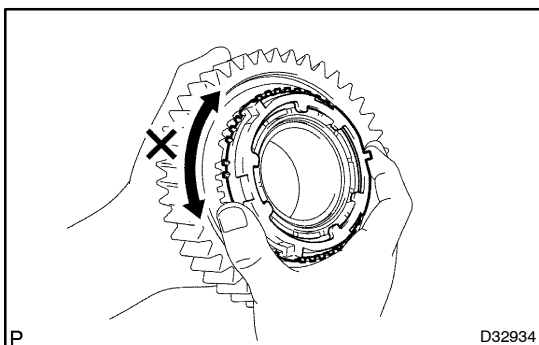
- (a) Using a feeler gauge, measure the clearance between the synchronizer ring and 1st gear spline.

Standard clearance:

1.10 to 2.10 mm (0.0433 to 0.08217 in.)

Minimum clearance: 1.10 mm (0.0433 in.)

If the clearance is less than the minimum, replace the synchronizer ring.



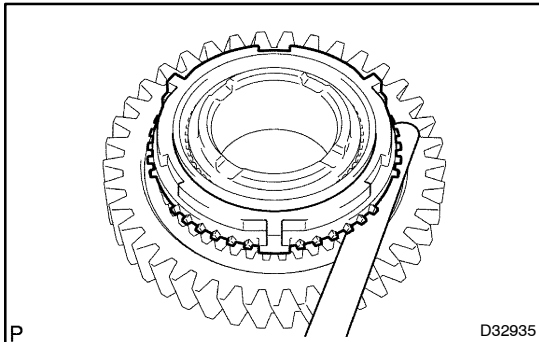
- (b) Coat the 1st gear cone with gear oil. Check the braking effect of the synchronizer ring. Turn the synchronizer ring in one direction while pushing it to the 1st gear cone. Check that the ring locks.

If the braking effect is insufficient, apply a small amount of the fine lapping compound between the synchronizer ring and 1st gear cone. Lightly rub the synchronizer ring and 1st gear cone together.

NOTICE:

Ensure the fine lapping compound is completely washed off after rubbing.

- (c) Check again the braking effect of the synchronizer ring.

**36. INSPECT REVERSE SYNCHRONIZER RING**

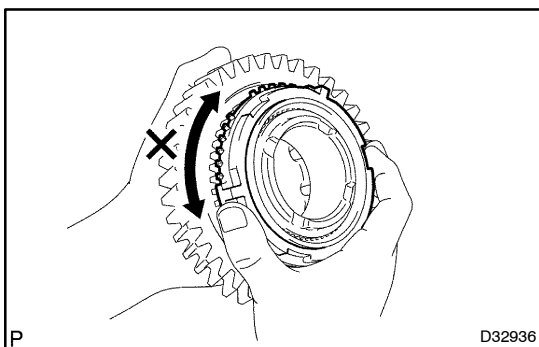
- (a) Using a feeler gauge, measure the clearance between the synchronizer ring and reverse gear spline.

Standard clearance:

0.78 to 1.62 mm (0.0307 to 0.0638 in.)

Minimum clearance: 0.78 mm (0.0307 in.)

If the clearance is less than the minimum, replace the reverse synchronizer ring.



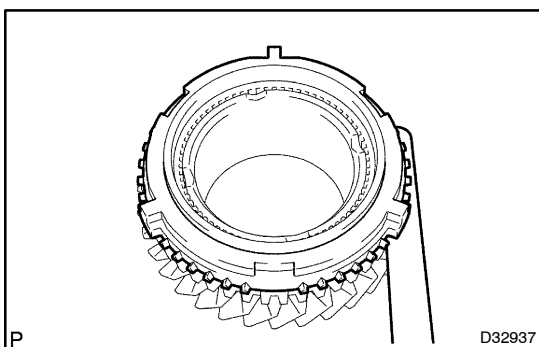
- (b) Coat the reverse gear cone with gear oil. Check the braking effect of the synchronizer ring. Turn the synchronizer ring in one direction while pushing it to the reverse gear cone. Check that the ring locks.

If the braking effect is insufficient, apply a small amount of the fine lapping compound between the synchronizer ring and reverse gear cone. Lightly rub the synchronizer ring and reverse gear cone together.

NOTICE:

Ensure the fine lapping compound is completely washed off after rubbing.

- (c) Check again the braking effect of the synchronizer ring.

**37. INSPECT SYNCHRONIZER RING NO. 3**

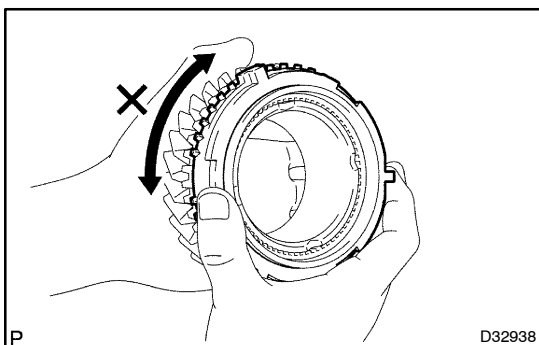
- (a) Using a feeler gauge, measure the clearance between the synchronizer ring and 3rd gear spline end.

Standard clearance:

0.78 to 1.62 mm (0.0307 to 0.0643 in.)

Minimum clearance: 0.78 mm (0.0307 in.)

If the clearance is less than minimum, replace the synchronizer ring.



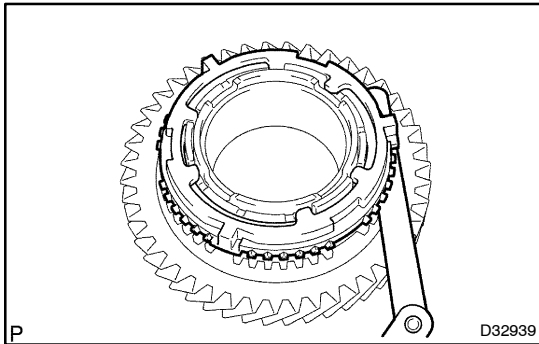
- (b) Coat the 3rd gear cone with gear oil. Check the braking effect of the synchronizer ring. Turn the synchronizer ring in one direction while pushing it to the 3rd gear cone. Check that the ring locks.

If the braking effect is insufficient, apply a small amount of the fine lapping compound between the synchronizer ring and 3rd gear cone. Lightly rub the synchronizer ring and 3rd gear cone together.

NOTICE:

Ensure the fine lapping compound is completely washed off after rubbing.

- (c) Check again the braking effect of the synchronizer ring.

**38. INSPECT SYNCHRONIZER RING SET NO. 2**

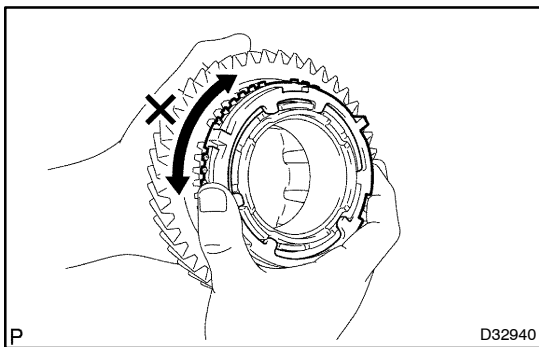
- (a) Using a feeler gauge, measure the clearance between the synchronizer ring and 2nd gear spline.

Standard clearance:

1.10 to 2.10 mm (0.0433 to 0.0827 in.)

Minimum clearance: 1.10 mm (0.0433 in.)

If the clearance is less than the minimum, replace the synchronizer ring.



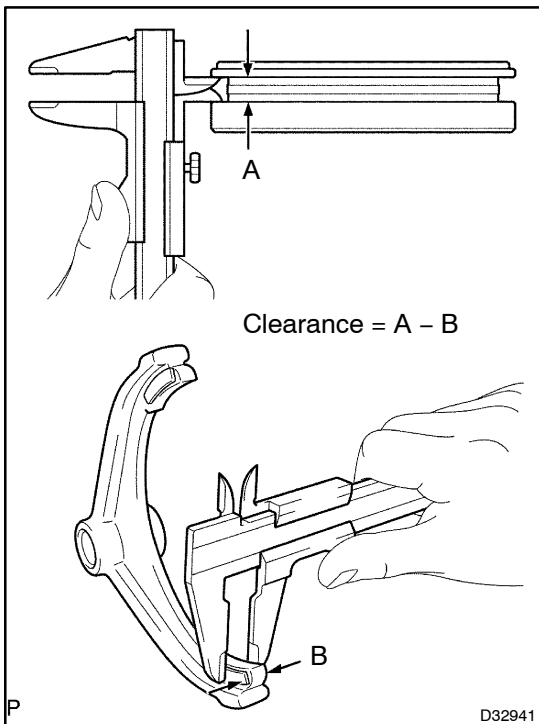
- (b) Coat the 2nd gear cone with gear oil. Check the braking effect of the synchronizer ring. Turn the synchronizer ring in one direction while pushing it to the 2nd gear cone. Check that the ring locks.

If the braking effect is insufficient, apply a small amount of the fine lapping compound between the synchronizer ring and 2nd gear cone. Lightly rub the synchronizer ring and 2nd gear cone together.

NOTICE:

Ensure the fine lapping compound is completely washed off after rubbing.

- (c) Check again the braking effect of the synchronizer ring.

**39. INSPECT TRANSMISSION HUB SLEEVE NO. 1**

- (a) Using a vernier caliper, measure the wide of the hub sleeve and thickness of the gear shift fork No. 1 as shown in the illustration.

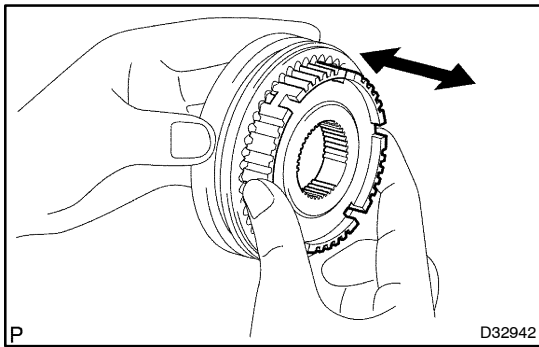
- (b) Calculate the clearance using the formula below.

Formula:

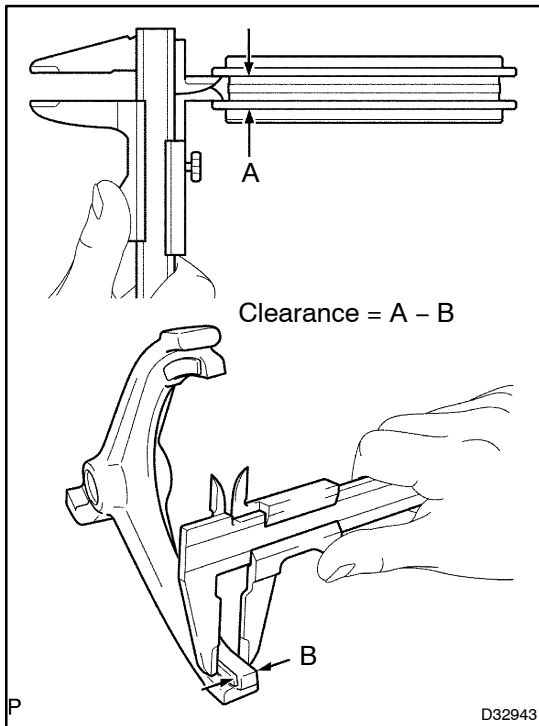
Clearance = A - B

Standard: 0.25 to 0.85 mm (0.0098 to 0.0335 in.)

If the clearance not as specified, replace the transmission hub sleeve No. 1 and gear shift fork No. 1.



- (c) Check the sliding condition between the hub sleeve and clutch hub.



40. INSPECT TRANSMISSION HUB SLEEVE NO. 2

- (a) Using a vernier caliper, measure the clearance between gear shift fork No. 2 and transmission hub sleeve No. 2.
 (b) Calculate the clearance using the formula below.

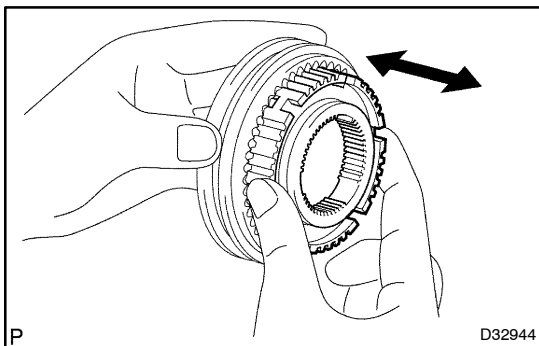
Formula:

$$\text{Clearance} = A - B$$

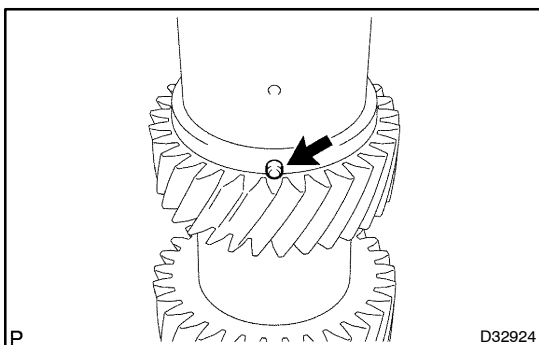
Standard clearance:

0.25 to 0.85 mm (0.0098 to 0.0335 in.)

If the clearance exceeds the standard, replace the gear shift fork No. 2 and transmission hub sleeve No. 2.

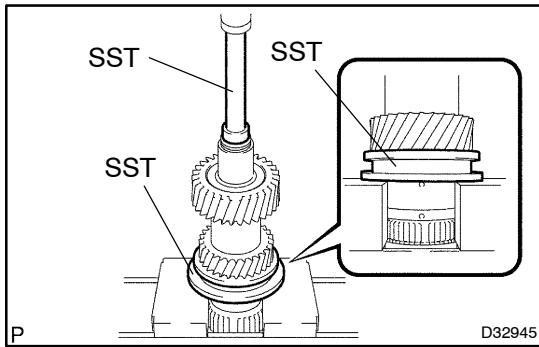


- (c) Check the sliding condition between the hub sleeve and clutch hub.



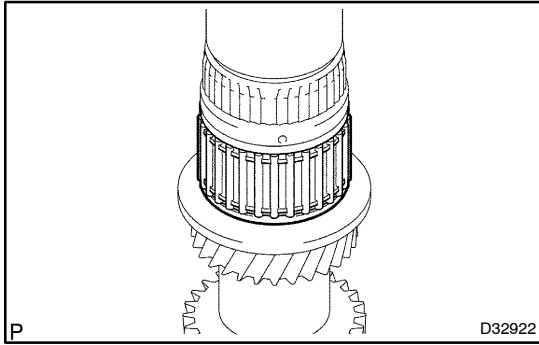
41. INSTALL 2ND GEAR THRUST WASHER PIN

- (a) Coat the pin with gear oil and install it.

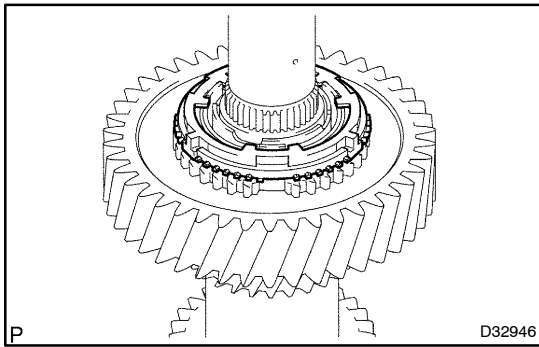
**42. INSTALL 2ND GEAR THRUST WASHER**

- (a) Using SST and a press, press in the 2nd gear thrust washer.

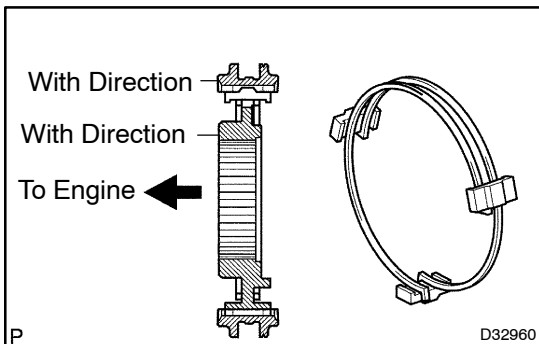
SST 09502-12010, 09950-60010 (09951-00300),
09950-70010 (09951-07100)

**43. INSTALL 2ND GEAR NEEDLE ROLLER BEARING**

- (a) Coat the needle roller bearing with gear oil and install it.

**44. INSTALL SYNCHRONIZER RING SET NO. 2**

- (a) Coat the synchronizer ring with gear oil and install it.

**45. INSTALL TRANSMISSION CLUTCH HUB NO. 2**

- (a) Coat the clutch hub with gear oil and install it to the hub sleeve.

HINT:

Set the hub sleeve and the clutch hub in correct orientation.

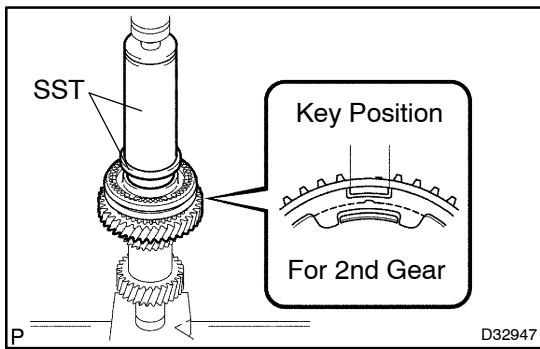
- (b) Install the 2 key springs and 3 keys to the hub sleeve.

NOTICE:

Do not set both opening of the shifting key springs in the same position.

46. INSTALL 2ND GEAR

- (a) Coat the 2nd gear with gear oil.

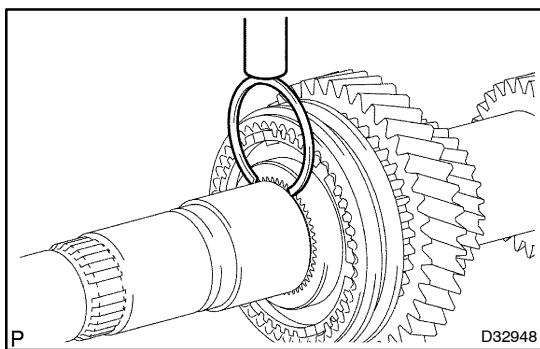


- (b) Using SST and a press, press in the 2nd gear.
SST 09316-20011, 09513-36040

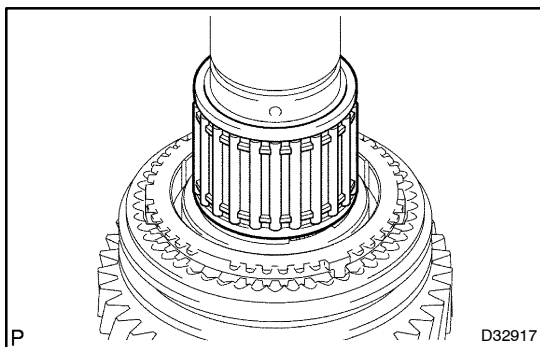
47. INSTALL TRANSMISSION CLUTCH HUB SHAFT SNAP RING NO. 2

- (a) Select a snap ring that allows minimum axial play.
Standard clearance: 0.10 mm (0.0039 in.) or less
Snap ring thickness:

| Mark | Specified Condition |
|------|--|
| A | 2.40 to 2.45 mm (0.0945 to 0.0965 in.) |
| B | 2.45 to 2.50 mm (0.0965 to 0.0984 in.) |
| C | 2.50 to 2.55 mm (0.0984 to 0.1004 in.) |
| D | 2.55 to 2.60 mm (0.1004 to 0.1024 in.) |
| E | 2.60 to 2.65 mm (0.1024 to 0.1043 in.) |
| F | 2.65 to 2.70 mm (0.1043 to 0.1063 in.) |

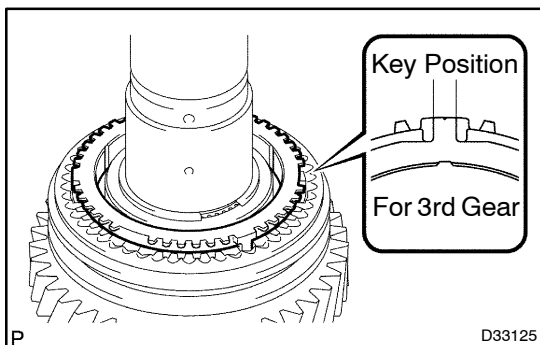


- (b) Using a brass bar and hammer, tap in the snap ring.



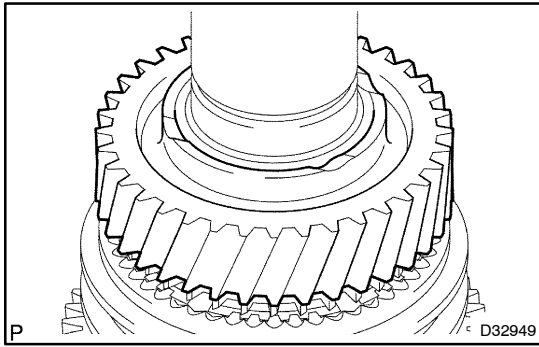
48. INSTALL 3RD GEAR NEEDLE ROLLER BEARING

- (a) Coat the needle roller bearing with gear oil and install it.

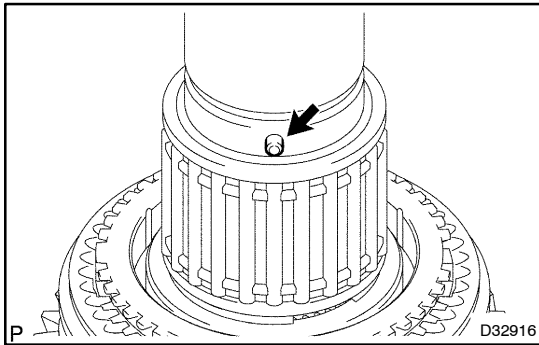


49. INSTALL SYNCHRONIZER RING NO.3

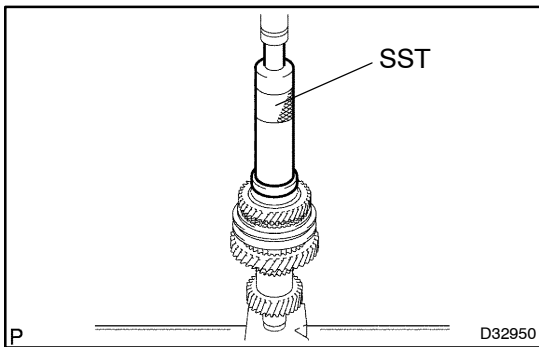
- (a) Coat the synchronizer ring with gear oil and install it.

**50. INSTALL 3RD GEAR**

- (a) Coat the gear with gear oil and install it.

**51. INSTALL 3RD GEAR THRUST WASHER PIN**

- (a) Coat the pin with grease and install it.

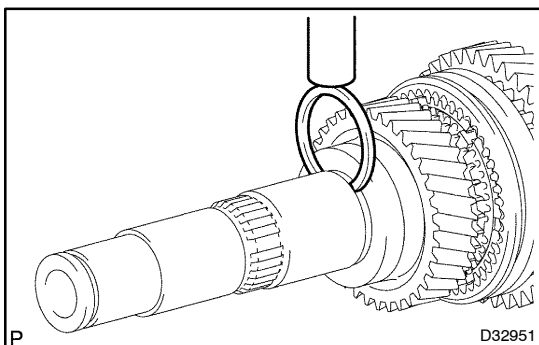
**52. INSTALL 3RD GEAR THRUST WASHER**

- (a) Using SST and a press, press in the thrust washer.
SST 09316-60011 (09316-00011)

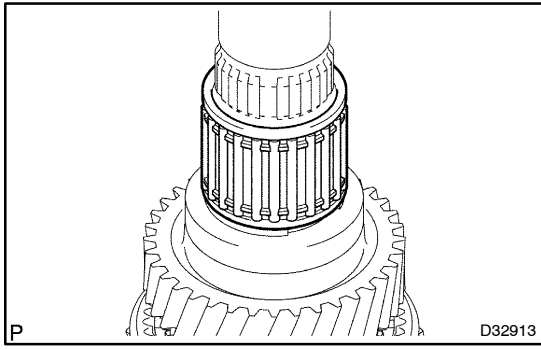
53. INSTALL 3RD GEAR THRUST WASHER HOLE SNAP RING

- (a) Select a snap ring will allow the minimum axial play.
Standard clearance: 0.10 mm (0.039 in.) or less
Snap ring thickness:

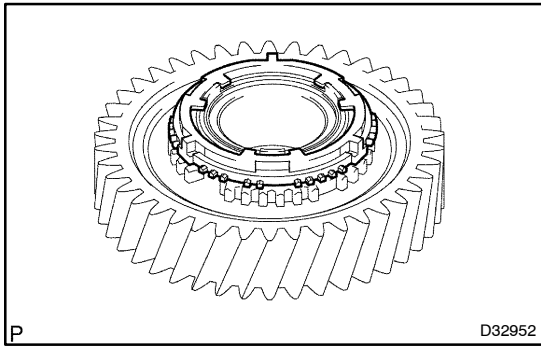
| Mark | Specified Condition |
|------|--|
| 1 | 2.40 to 2.45 mm (0.0945 to 0.0965 in.) |
| 2 | 2.45 to 2.50 mm (0.0965 to 0.0984 in.) |
| 3 | 2.50 to 2.55 mm (0.0984 to 0.1004 in.) |
| 4 | 2.55 to 2.60 mm (0.1004 to 0.1024 in.) |
| 5 | 2.60 to 2.65 mm (0.1024 to 0.1043 in.) |
| 6 | 2.65 to 2.70 mm (0.1043 to 0.1063 in.) |



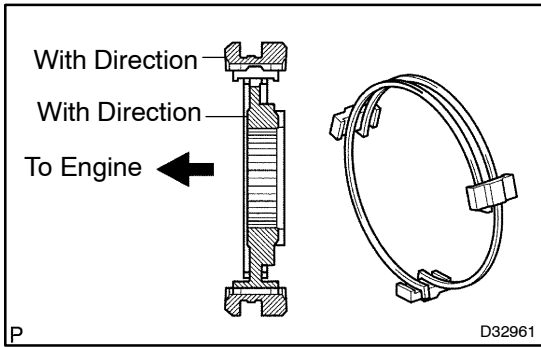
- (b) Using a brass bar and hammer, tap in the snap ring.



- 54. INSTALL 1ST GEAR NEEDLE ROLLER BEARING**
 (a) Coat the needle roller bearing with gear oil and install it.



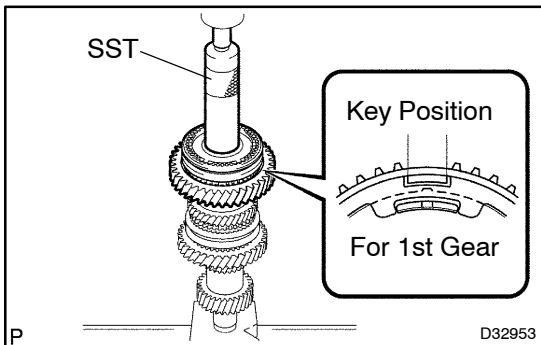
- 55. INSTALL SYNCHRONIZER RING SET NO.1**
 (a) Coat the synchronizer ring with gear oil and install it on the 1st gear.



- 56. INSTALL TRANSMISSION CLUTCH HUB SLEEVE ASSY NO. 1**
 (a) Coat the hub sleeve with gear oil and install it to the clutch hub.

HINT:
 Set the hub sleeve and the transmission clutch hub No. 1 in correct orientation.

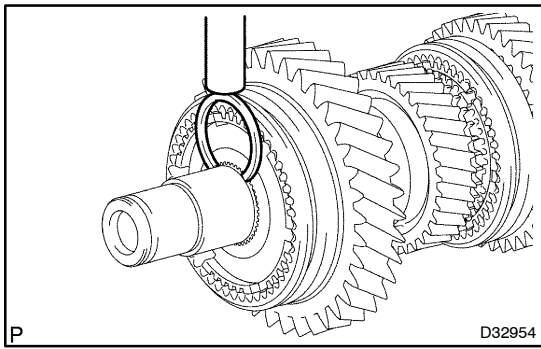
- (b) Install the 2 key springs and 3 keys to the hub sleeve.
NOTICE:
 Do not set both opening of the shifting key springs in the same position.



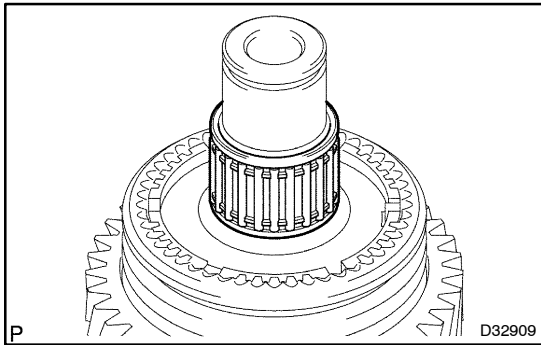
- 57. INSTALL 1ST GEAR**
 (a) Coat the 1st gear with gear oil.
 (b) Using SST and a press, press in the 1st gear.
 SST 09316-60011 (09316-00011)

- 58. INSTALL TRANSMISSION CLUTCH HUB SHAFT SNAP RING NO. 1**
 (a) Select a snap ring that allows minimum axial play.
Standard clearance: 0.10 mm (0.039 in.) or less

| Mark | Specified Condition |
|------|--|
| A | 2.40 to 2.45 mm (0.0945 to 0.0965 in.) |
| B | 2.45 to 2.50 mm (0.0965 to 0.0984 in.) |
| C | 2.50 to 2.55 mm (0.0984 to 0.1004 in.) |
| D | 2.55 to 2.60 mm (0.1004 to 0.1024 in.) |
| E | 2.60 to 2.65 mm (0.1024 to 0.1043 in.) |
| F | 2.65 to 2.70 mm (0.1043 to 0.1063 in.) |

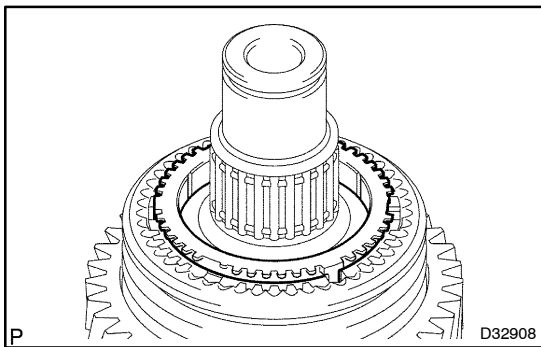


(b) Using a brass bar and hammer, tap in the snap ring.



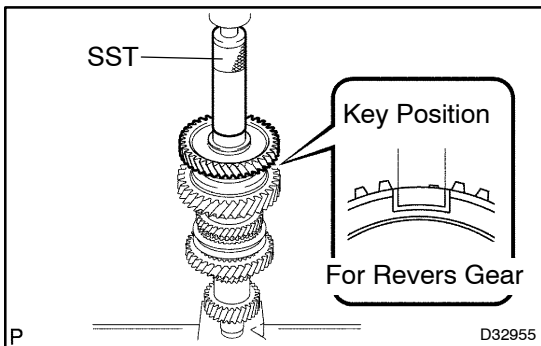
59. INSTALL REVERSE GEAR NEEDLE ROLLER BEARING

(a) Coat the needle roller bearing with gear oil and install it.



60. INSTALL REVERSE SYNCHRONIZER RING

(a) Coat the synchronizer ring with gear oil and install it to the transmission hub sleeve No. 1.



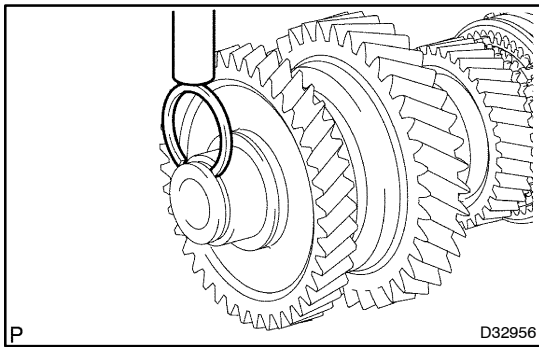
61. INSTALL REVERSE GEAR

(a) Coat the gear with gear oil.
 (b) Using SST and a press, press in the reverse gear and a new counter gear front bearing (inner race).
 SST 09608-06041

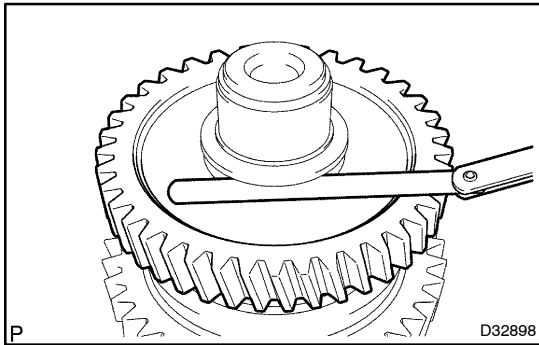
62. INSTALL COUNTER GEAR FRONT BEARING HOLE SNAP RING

(a) Select a hole snap ring that will allow minimum axial play.
Standard clearance: 0.10 mm (0.039 in.) or less
Snap ring thickness:

| Mark | Specified Condition |
|------|--|
| A | 2.40 to 2.45 mm (0.0945 to 0.0965 in.) |
| B | 2.45 to 2.50 mm (0.0965 to 0.0984 in.) |
| C | 2.50 to 2.55 mm (0.0984 to 0.1004 in.) |
| D | 2.55 to 2.60 mm (0.1004 to 0.1024 in.) |
| E | 2.60 to 2.65 mm (0.1024 to 0.1043 in.) |
| F | 2.65 to 2.70 mm (0.1043 to 0.1063 in.) |



- (b) Using a brass bar and hammer, tap in the snap ring.



63. INSPECT REVERSE GEAR THRUST CLEARANCE

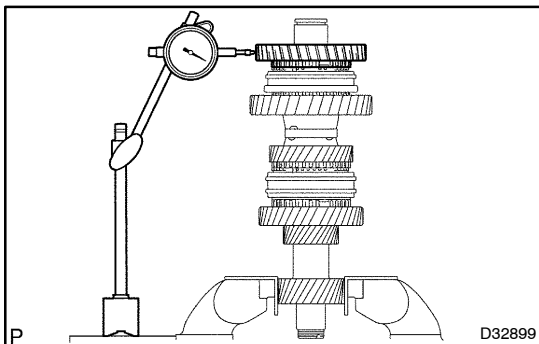
- (a) Fix the counter gear through 2 protective aluminum plates in a vise.

- (b) Using a feeler gauge, measure the gear thrust clearance.

Standard clearance:

0.10 to 0.45 mm (0.0039 to 0.0177 in.)

Maximum clearance: 0.45 mm (0.0177 in.)



64. INSPECT REVERSE GEAR RADIAL CLEARANCE

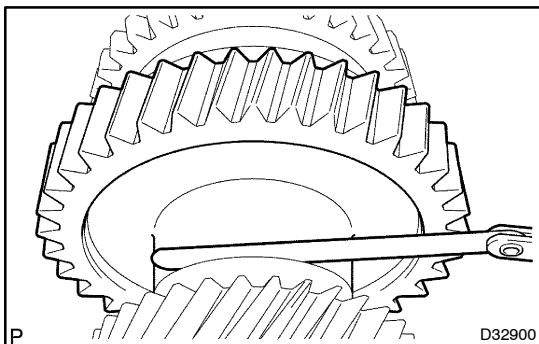
- (a) Using a dial indicator, measure the reverse gear radial clearance between the gear and shaft.

Standard clearance:

0.015 to 0.068 mm (0.0006 to 0.0027 in.)

Maximum clearance: 0.068 mm (0.0027 in.)

If the clearance is not as specified, replace the reverse gear needle roller bearing.



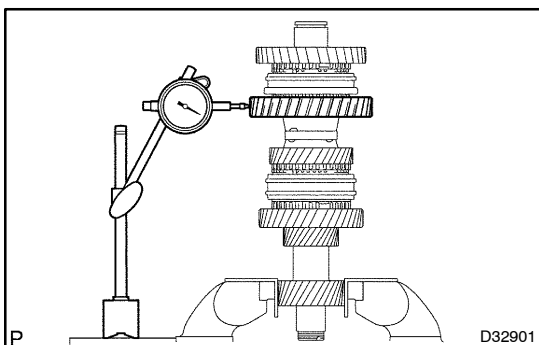
65. INSPECT 1ST GEAR THRUST CLEARANCE

- (a) Using a feeler gauge, measure the gear thrust clearance.

Standard clearance:

0.10 to 0.45 mm (0.0039 to 0.0177 in.)

Maximum clearance: 0.45 mm (0.0177 in.)



66. INSPECT 1ST GEAR RADIAL CLEARANCE

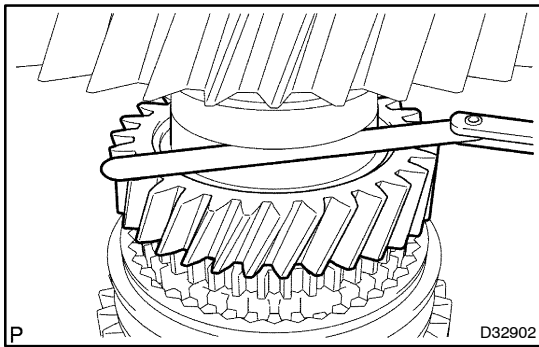
- (a) Using a dial indicator, measure the gear radial clearance between the gear and shaft.

Standard clearance:

0.015 to 0.068 mm (0.0006 to 0.0027 in.)

Maximum clearance: 0.068 mm (0.0027 in.)

If the clearance is not as specified, replace the 1st gear needle roller bearing.

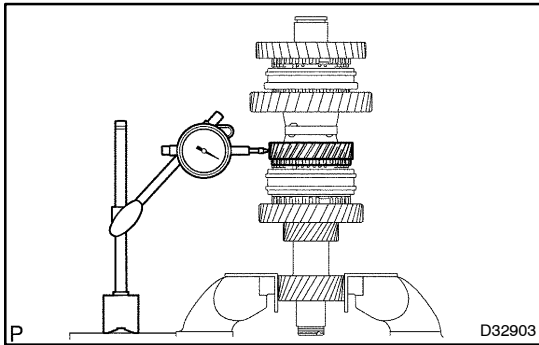
**67. INSPECT 3RD GEAR THRUST CLEARANCE**

- (a) Using a feeler gauge, measure the gear thrust clearance.

Standard clearance:

0.10 to 0.45 mm (0.0039 to 0.0177 in.)

Maximum clearance: 0.45 mm (0.0177 in.)

**68. INSPECT 3RD GEAR RADIAL CLEARANCE**

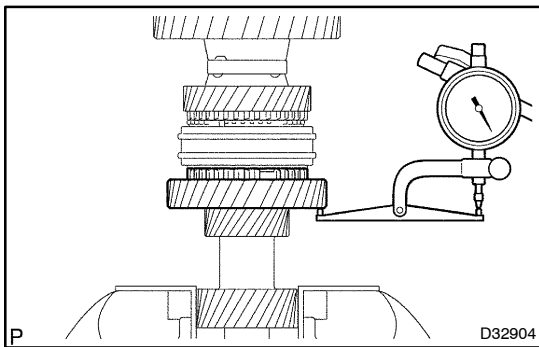
- (a) Using a dial indicator, measure the gear radial clearance between the gear and shaft.

Standard clearance:

0.015 to 0.068 mm (0.0006 to 0.0027 in.)

Maximum clearance: 0.068 mm (0.0027 in.)

If the clearance is not as specified, replace the 3rd gear needle roller bearing.

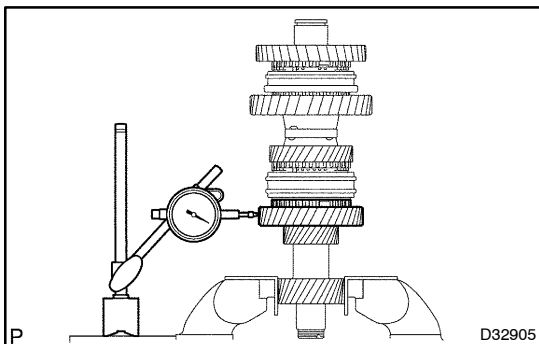
**69. INSPECT 2ND GEAR THRUST CLEARANCE**

- (a) Using a dial indicator, measure the gear thrust clearance.

Standard clearance:

0.10 to 0.35 mm (0.0039 to 0.0138 in.)

Maximum clearance: 0.35 mm (0.0138 in.)

**70. INSPECT 2ND GEAR RADIAL CLEARANCE**

- (a) Using a dial indicator, measure the gear radial clearance between the gear and shaft.

Standard clearance:

0.015 to 0.068 mm (0.0006 to 0.0027 in.)

Maximum clearance: 0.068 mm (0.0027 in.)

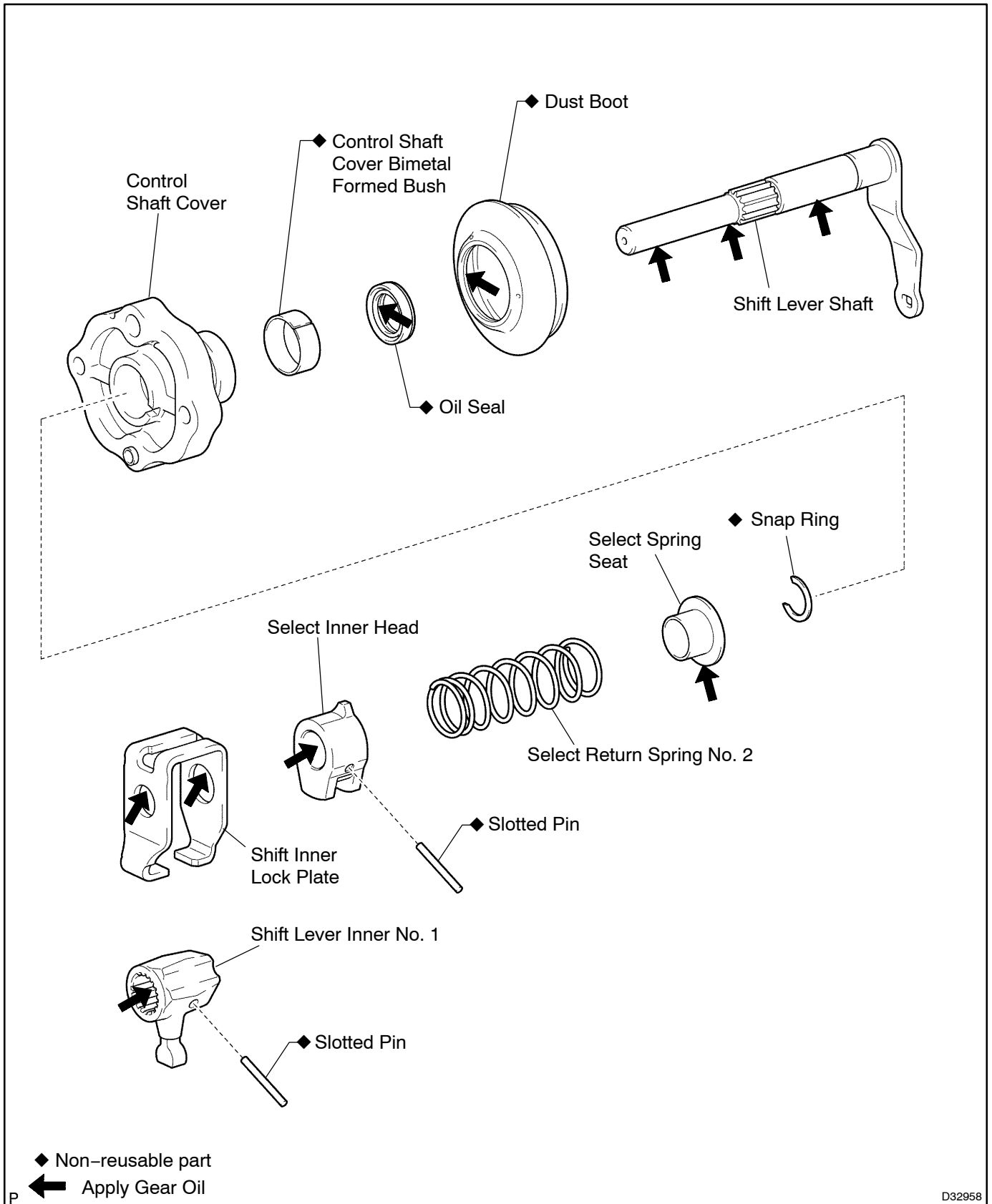
If the clearance is not as specified, replace the 2nd gear needle roller bearing.

- (b) Remove the counter gear from the vise.

SHIFT LEVER SHAFT HOUSING ASSY (M550)

COMPONENTS

41001-02



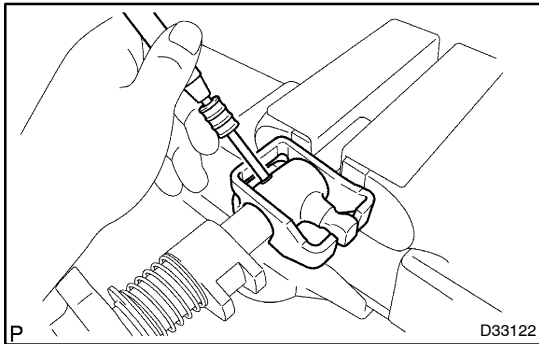
P

D32958

OVERHAUL

1. REMOVE SHIFT LEVER INNER NO. 1

- (a) Fix the shift lever shaft through 2 protective aluminium plates in a vise.

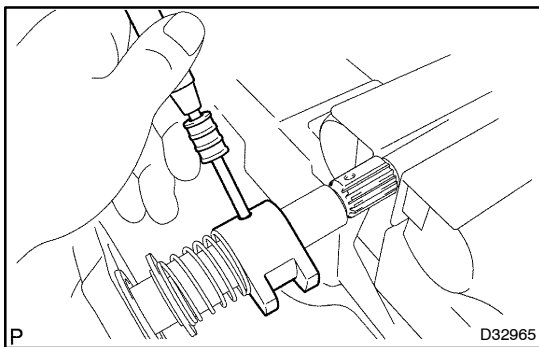


- (b) Using a pin punch (5 mm (0.20 in.)) and hammer, tap out slotted pin. Remove the shift lever and shift inner lock plate from the shift lever shaft.

2. REMOVE SELECT INNER HEAD

- (a) Using a pin punch (5 mm (0.20 in.)) and hammer, tap out slotted pin.

- (b) Remove the select inner head, select return spring and select spring sheet from the shift lever shaft.

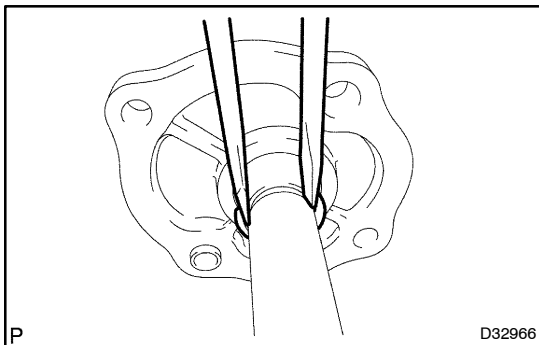


3. REMOVE CONTROL SHAFT COVER

- (a) Using 2 screwdrivers and hammer, tap out the snap ring. Remove the shift lever shaft from the control shaft cover.

- (b) Remove the dust boots from the shift lever shaft.

- (c) Remove the shift lever shaft from the vise.

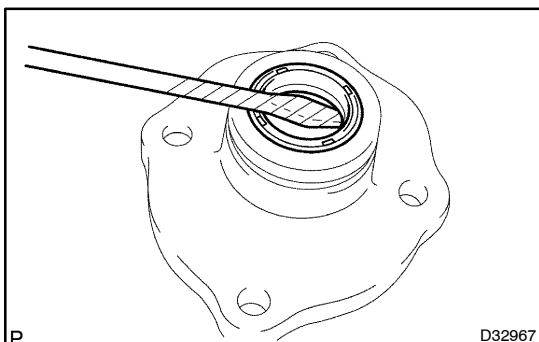


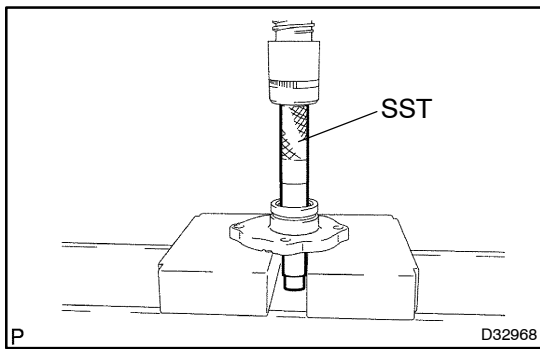
4. REMOVE CONTROL SHAFT COVER OIL SEAL

- (a) Using a screwdriver, pry out the oil seal from the control shaft cover.

HINT:

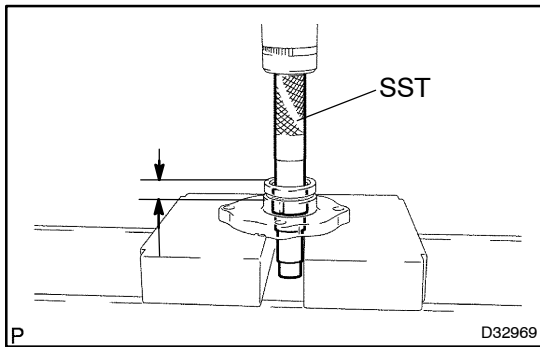
Tape the screwdriver tip before use.





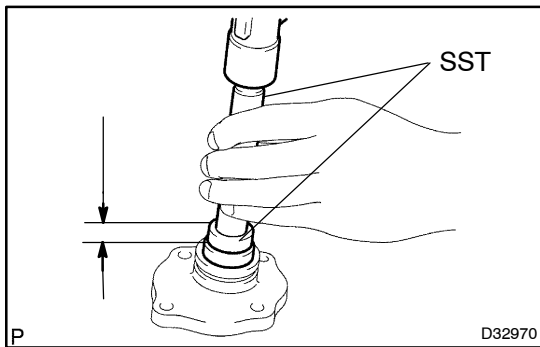
5. REMOVE CONTROL SHAFT COVER BIMETAL FORMED BUSH

- (a) Using SST and a press, press out the bush from the control shaft cover.
SST 09222-30010



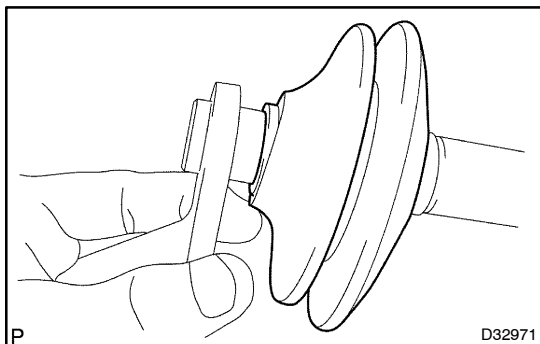
6. INSTALL CONTROL SHAFT COVER BIMETAL FORMED BUSH

- (a) Using SST and press, press in a new control shaft cover bimetal foamed bush to the control shaft cover.
SST 09222-30010
Drive in depth: 9.0 to 10.0 mm (0.3543 to 0.3937 in.)



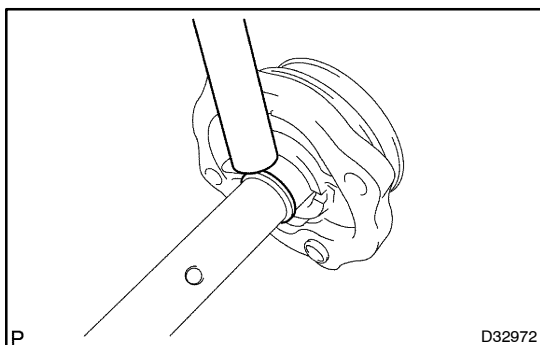
7. INSTALL CONTROL SHAFT COVER OIL SEAL

- (a) Using SST and a hammer, tap in a new oil seal to the control shaft cover.
SST 09950-60010 (09951-00310), 09950-70010 (09951-07100)
Drive in depth: 0 to 1.0 mm (0 to 0.0394 in.)
- (b) Coat the control shaft cover oil seal with MP grease.

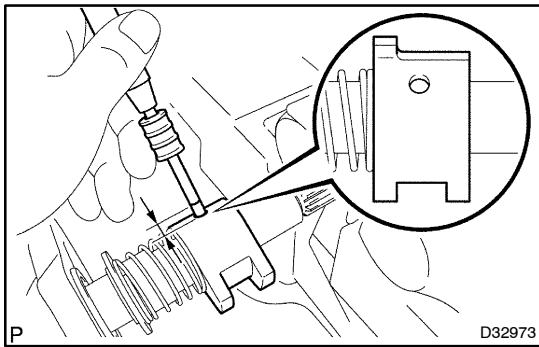


8. INSTALL CONTROL SHAFT COVER

- (a) Coat the shift lever shaft and boot with MP grease.
(b) Install the control shaft cover to the shift lever shaft.



- (c) Using a brass bar and hammer, tap in a new snap ring to the shift lever shaft.



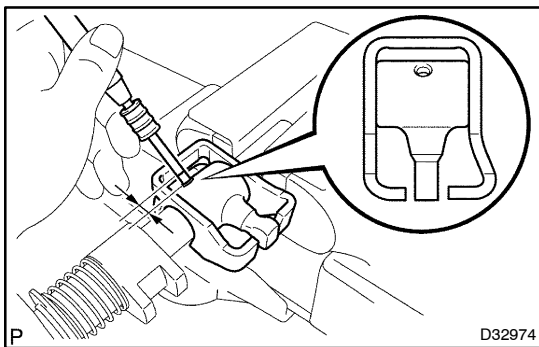
9. INSTALL SELECT INNER HEAD

- (a) Fix the select lever shaft lever shaft through 2 protective aluminum plates in a vise.
- (b) Coat the select spring sheet with MP grease.
- (c) Install the select spring sheet, select return spring and select inner head to the shift lever shaft.
- (d) Using a pin punch (5 mm (0.20 in.)) and hammer, tap in the slotted pin to the shift lever shaft.

Drive in depth: 0 to 1.0 mm (0 to 0.0394 .in)

NOTICE:

Be careful with the installation direction of the select inner head.



10. INSTALL SHIFT LEVER INNER NO. 1

- (a) Coat the shift lever and shift inner lock plate with MP grease.
- (b) Install the shift lever and shift inner lock plate to the shift lever shaft.
- (c) Using a pin punch (5 mm (0.20 in.)) and hammer, tap in a new slotted pin to the shift lever shaft.

Drive in depth: 0 to 1.0 mm (0 to 0.0394 .in)

NOTICE:

Be careful with the installation directions of the shift lever inner No. 1 and shift interlock plate.

- (d) Remove the shift lever shaft from the vise.

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